MODERN PLASTICS



PUBLIC
MAR 12
DETROIT

MARCH 1947

√R v.24² March-Aug. 1947

NEW DESIGN TECHNIQUE INCORPORATES DUREZ



Convincing evidence of the modern trend towards functional design is effectively revealed in these illustrations of the old and the new Belfone "Maestro" intercommunication units.

Notice how the hard, "mechanical" look of the prewar Belfone has been replaced by an attractive molded Durez plastic housing that gives this new product an air of superior quality, as well as supplying it with many other physical benefits required by the manufacturer.

What This User Wanted

In this connection Mr. Floyd W. Bell, President of Bell Sound Systems, Inc., comments interestingly . . ."Our new design offers many functional advantages in addition to its beauty. The rounded top of the new Belfone eliminates the natural tendency to pile papers and other material on top of it, building up insulation and hindering the free circulation of air. Since the many curved surfaces and encircling louvers would be impractical in wood, the cabinet is being molded of Durez. Its over-all attractiveness makes it suitable for use on the finest executive desk. The durability of Durez ends for all time the many disadvantages of old-fashioned flat-top housings and the scratching to which wood is susceptible. In addition, its imperviousness to atmospheric conditions provides undiminished lasting beauty."

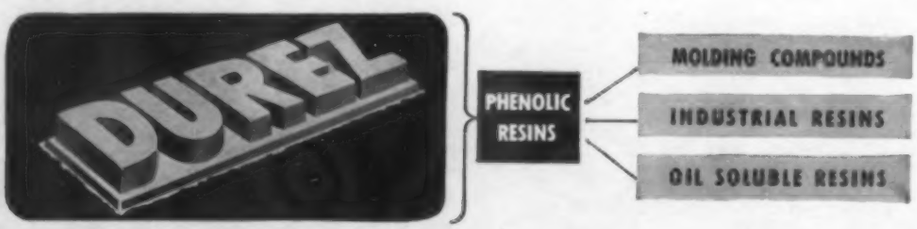
Unlike other housings of this type which are molded in one piece with an open bottom or back, the new Belfone housing consists of two pieces comprising the front and back sections. These are molded separately and assembled with molded end flanges in a slot. Molds for producing this unique construction were developed by Bell engineers in cooperation with the Plastics Division of Continental Can Co.

What You Can Get

The general-purpose Durez plastic used is one of more than 300 multi-propertied molding compounds developed by Durez laboratory engineers. Heat resistance, dielectric strength, non-resonance, and impact resistance are some of the important characteristics inherent in all Durez phenolic plastics.

We'd like to work on any of your problems that phenolic plastics may solve. The competent counsel of experienced Durez technicians, as well as a library of proved product development data, awaits your enquiry.

Durez Plastics & Chemicals, Inc., 253 Walck Road, North Tonawanda, N. Y.
Export Agents: Omni Products Corporation, 40 E. 34th St., New York, N. Y.



PLASTICS THAT FIT THE JOB

Tech.



GOOD FELLOWSHIP REIGNS...AS *Loalin* POURS

They're brimful of color, these gay and festive plastics pourers known as *Tavern Toppers*. Ready to add a gala touch to any occasion where "good fellows get together", they are sturdy and practical, too, for they are molded of Loalin.

When the molder sought a compound for this application his first requirement was a material that was impervious to alcohol. For production economy he needed a lightweight material that would deliver a maximum number of finished pieces per pound. And it goes without saying that another "must" was the appealing touch of sparkling, brilliant color. The logical choice was Loalin.

Loalin, a polystyrene molding compound and a prominent member of the Catalin plastics family, brings these and many other advantages to both molder and application. Loalin has excellent dimensional stability, making it ideal for precision moldings held to close tolerances. Loalin is physically strong and has desirable electrical properties. Add to this its favorable material cost and the reasons for its tremendous demand are at once apparent.

When selecting a material for your next new product application, remember these two fine names in plastics — Loalin polystyrene molding powders and Catalin cast and liquid resins. The technical staff at Catalin will be happy to join with designers, engineers and manufacturers in the all-important planning of materials and methods. Inquiries invited!

CATALIN CORPORATION OF AMERICA
ONE PARK AVENUE • NEW YORK 16, N.Y.

"Tavern Toppers" are molded by Sterling Plastics Company, Union, N. J.



CAST RESINS • LIQUID RESINS • MOLDING COMPOUNDS

MODERN PLASTICS

VOLUME 24 MARCH 1947 NUMBER 7

CONTENTS

General Section

Unity (Editorial) 5

Is plastics' future tied to coal? 89

A large portion of the chemical industry is now dependent upon the steel industry for by-products of the coking process. Future expansion may depend upon development of new additional sources for chemicals.

Drawn acrylic lid on deep freeze unit 94

Heavy duty for high-pressure laminates 97

High pressure laminates have proved successful as the guiding plates and pins for the tables of industrial planes.

Barrel head and staves are bonded with phenolic resin 98

Laminates for outdoor displays 100

Glass mat and glass cloth impregnated with polyester resin is molded under low pressure to form the new Fisk Tire signs which comprise one of two sizes of "time to retire" boys.

Reviewing S.P.E.'s meeting and exhibit 102

A cold-pour plastic material 103

by J. F. T. Berliner—A urea-formaldehyde formulation mixed with plaster makes this cold-pour material that can be handled like plaster of Paris. More durable than plaster it has found use in plaques, small statues.

Britain develops a new structural plastic ... 105

Resin impregnated paper strips are rolled into a tube, then given a rectangular-shaped cross section by forming on a mandrel. This tubing is next faced with paper laminates and cured under heat and pressure. The resulting structure has good strength characteristics which open for it many applications in the building field.

Carrying through a good idea 117

No matter how sound a plastic application is, it needs to be sold to the public through advertising, counter displays and other merchandising means.

Die cutting heavy acrylic sheet 120

S.P.I. low-pressure division meeting 122

Digests of the speeches presented before this meeting and a brief mention of the discussions that took place with particular reference to the future of this branch of the plastics industry.

Auto haze lights of polystyrene 124

Trends in molded plastic housings 126

Plastics have come to be an accepted material for the housings of all types of equipment and instruments. This article points up the reasons for plastics long acceptance in this type of application.

Plastics-Engineering Section

Cost analysis of dielectric preheating 131

by T. N. Willcox

Fabricating of cellulose acetate 138

by R. G. O'Kane—A detailed discussion of the steps involved in the various types of fabricating including sewing, embossing, drilling, forming and blowing.

Sintered metal cavities 144

Metallic powder, pressed against the face of a hob so that it takes the impression of the design and then baked, is being used in the production of plastics molding cavities that are difficult or expensive to machine or hob.

How to saw vinylidene chloride 148

by H. J. Chamberland

Technical Section

Flameproofing of cotton fillers in plastic laminates 151

by Simon Williams, John B. Alfers and Carl M. Furgason

Mesamoll plasticizers for polyvinyl chloride .. 154

A good plasticizer for polyvinyl chloride, Mesamoll has the additional advantage of being low in price. This report indicates directions in which this type of plasticizer may be developed to give further improved plasticizing properties.

Plastics digest 158

Technical briefs 162

U. S. plastics patents 166

News and Features

Plastics products 109

Plastics production figures for 1946 119

Books and booklets 170

New machinery and equipment 174

Plastics stock molds 180

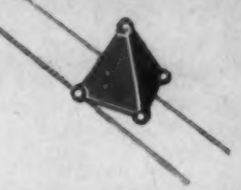
News of the industry 182

"EXECUTIVE and EDITORIAL OFFICE: 122 E. 42nd St., New York 17, N. Y. Published every month by Modern Plastics, Inc., at Publication Office: Twentieth and Northampton Sts., Easton, Pa. Entered as second class matter, May 28, 1940, at the Post Office at Easton, Pa., under the act of March 3, 1879." Copyright 1947 by Modern Plastics, Inc. All rights reserved. Subscription $5.00 a year, $8.00 for two years in U. S., its possessions and South America. Canadian subscriptions $5.50 per year. All other countries $6.00 per year, payable in New York funds.



Traffic paint protectors designed, patented and manufactured by Plastic Engineering, Inc.

Now they're making highway markers from GEON



<u>Another</u> interesting application for GEON raw materials

THOSE highway markers—more properly known as "traffic paint protectors"—are lightweight, easy to handle. They're permanently colored, unaffected by sun, rain, air, heat, cold, paint, oil, or any one of hundreds of normally destructive factors. They're sufficiently resilient that they won't break when dropped from truck to painted line. Nor will they harm a tire if accidentally struck by a car. It was possible to mold them from one of the GEON polyvinyl materials in such a way that they stack easily, yet always land in the right position when dropped from the paint truck.

These properties, plus many others, have made versatile GEON the ideal material for literally hundreds of products in the home and in industry—shower curtains and fly swatters—upholstery and floor tiles—clothing and luggage—wire insulation and acid tank linings.

And GEON can be pressure or injection molded, extruded, calendered or cast into sheet or film. In solution or latex forms it can be applied as coatings for fabrics and fibres of all kinds as well as for paper and cardboard. Products made from GEON may be flexible or rigid, clear or opaque, brilliantly or delicately colored.



For more information about GEON, please write Dept. O-3, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company A DIVISION OF THE B. F. GOODRICH COMPANY



Chicago Molded PLASTICS

ADD SPICE TO THE PRODUCT!

Spices are usually classed as staples . . . purchased singly . . . and seldom. But the Griffith Laboratories of Chicago felt that proper merchandising could take their product out of this class and thereby increase the demand.

They came to CMPC with their problem . . . and got the answer. It's shown above . . . a handsome spice set injection molded of polystyrene. This material, in glistening white or brilliant red, was selected not only for its eye-appeal but for its light weight, resistance to moisture, and dimensional stability. Combined with the white jars and colorful jar tops it gives Griffith every advantage in the consumer field. Acceptance by the trade has already proved that.

It's another good example of the ability of this organization to tackle most any molded plastics problem and come up with the right answer.

Perhaps you have a product that could benefit by this type of merchandising . . . by improving its consumer appeal and utility. But whatever your problem, if it involves the use of molded plastics, you'll find it worthwhile to discuss it with a CMPC Service Engineer. Your request incurs no obligation.

CHICAGO MOLDED PRODUCTS CORPORATION

1046 N. Kolmar Ave. Chicago 51, Illinois

Representatives in principal industrial centers

COMPRESSION AND INJECTION MOLDING OF ALL PLASTIC MATERIALS

EDITORIAL STAFF

Editor: CHARLES A. BRESKIN
Executive Editor: LAURA E. MORRISON
Technical Editor: DR. GORDON M. KLINE
Engineering Editor: FRED B. STANLEY
Features Editor: R. L. VAN BOSKIRK
Art Director: DONALD R. RUTHER
Midwestern Editor: VAL WRIGHT
Associate Editor: ANITA COMSTOCK
Assistant Editor: VIRGINIA SUE WILSON
Reader's Service: F. M. GOTTHEIMER

EXECUTIVE STAFF

Publisher: CHARLES A. BRESKIN
General Manager: ALAN S. COLE
Associate Publisher: HIRAM McCANN

BUSINESS STAFF

Advertising Manager: ALAN S. COLE

P. H. Backstrom — A. M. Rothenberg
M. A. Olsen — Burton W. Gussow
J. M. Connors — Joseph A. Drucker
R. C. Beggs — W. F. Kennedy

Promotion Manager: LEE K. BENDHEIM

Production Manager: DANIEL M. BROADS
Ass't Production Manager: F. R. HARRIS

Executive and Editorial Offices:
122 E. 42nd St., New York 17, N. Y.

Circulation Department
Circulation Manager: FREDERICK A. KLEIN
32 Broadway, New York 4, N. Y.
Tel., WHitehall 4-4782

Branch Offices
Chicago 1: 221 N. La Salle St.
Manager: J. M. CONNORS
Tel., Randolph 5588
Cleveland 14: 815 Superior Ave.
Tel., Superior 0737
Los Angeles 5: 2412 W. 7th St.
Tel., Fairfax 2978

MODERN PLASTICS is fully protected by copyright and nothing that appears in it may be reprinted wholly or in part, without special permission.

Member Audit Bureau of Circulation
MODERN PLASTICS is regularly indexed in Industrial Arts Index and Industex.

Unity

The plastics exhibition sponsored by the S.P.E. in Chicago in January has come and gone. As anticipated the exhibition itself was unsatisfactory. It was obvious that the industry had ruled against it long before the performance date.

There seems to be a majority opinion that the show was not representative of the industry—was harmful to the best interests of plastics, failed to impart a high-quality impression of the industry to visitors. Not the least of its shortcomings was the carnival type ballyhoo blared forth from sound trucks.

Flash judgment might place responsibility for this unsatisfactory performance upon S.P.E. alone. In our humble opinion, however, the failure of the show was only surface evidence of an infectious virus that has bored into the industry's vitals and must be driven out. The virus is a mixture of intra-industry politics and personal prejudices which gives secondary consideration to the industry's public welfare. If allowed to continue, it will weaken the entire body to such an extent that the plastics industry will lack organization and a united front for the nation-wide competitive struggle that is close at hand.

Ironically enough, the January show could be the motivating agent to start the cure. Certainly it served to call forceful attention to the need for a remedy.

There are several favorable factors which indicate that the various groups are at long last resolved to settle their differences. Committees from P.M.M.A. and S.P.E. met in Chicago to determine the differences that must be reconciled. Later they will meet with an S.P.I. committee for further discussion. The S.P.E., with this experience behind them, now know that trade shows need trained minds with management experience to guide them. The Society has cleaned house in its own organization in order to tighten up and streamline its affairs. It is in a mood to listen to reasonable plans of cooperation *and to organize* on a basis which will ultimately bring benefit to the industry.

Various methods for bringing the S.P.I. and S.P.E. together have been mentioned. Two typical ones are:

Plan I

a. The Society of the Plastics Industry to integrate technical and engineering activities with those of the Society of the Plastics Engineers and to jointly conduct all technical chapter meetings. It is noteworthy that though S.P.E.'s Chicago exhibit was a failure, the technical meetings, held at the same time, were an outstanding success. They were generally regarded as among the most worthwhile group of technical meetings ever held at a plastics assembly.

b. The by-laws of S.P.I. to be changed to permit eligibility of all S.P.E. members in S.P.I. on some predetermined professional basis.

c. Autonomy of the technical and engineering division within S.P.I. and adequate representation on the Board of Directors.

d. Funds to be supplied the technical and engineering division from the S.P.I. treasury upon submission of program and budget to S.P.I. Board of Directors.

(*Please turn to page 194*)



A PRODUCTION MANAGER SPEAKS:

- "We're production minded at our plant and we run our LESTERS on a 24 hour schedule more than 300 days a year . . A machine has got to be tough and it has to be made right to stand up under the punishment we give it . . We have a lot of LESTERS here and so far as we're concerned, if it's plastic production—the NEW Lester has the answer . . "
- The new LESTERS are built for production. LESTER, and only LESTER has these exclusive features, all developed for "production minded" plastic molders . . 1. The one piece, cast alloy steel frame with no moveable parts to get out of adjustment . . 2. The unique LESTER vertical injection system, open on all sides for quick, easy cleaning and adjustment . . 3. LESTER patented toggle mechanism with *all* of the die locking pressure carried on four metal columns—not on pins that wear out . . 4. Greater platen travel permitting use of larger, deeper molds . . 5. Larger die height adjusting screw with supporting area equal to die area prevents platen deflection . . 6. Flexibility of control of both injection speed and injection pressure is standard equipment on all models . . 7. The LESTER safety gate is interlocked hydraulically, electrically and mechanically.

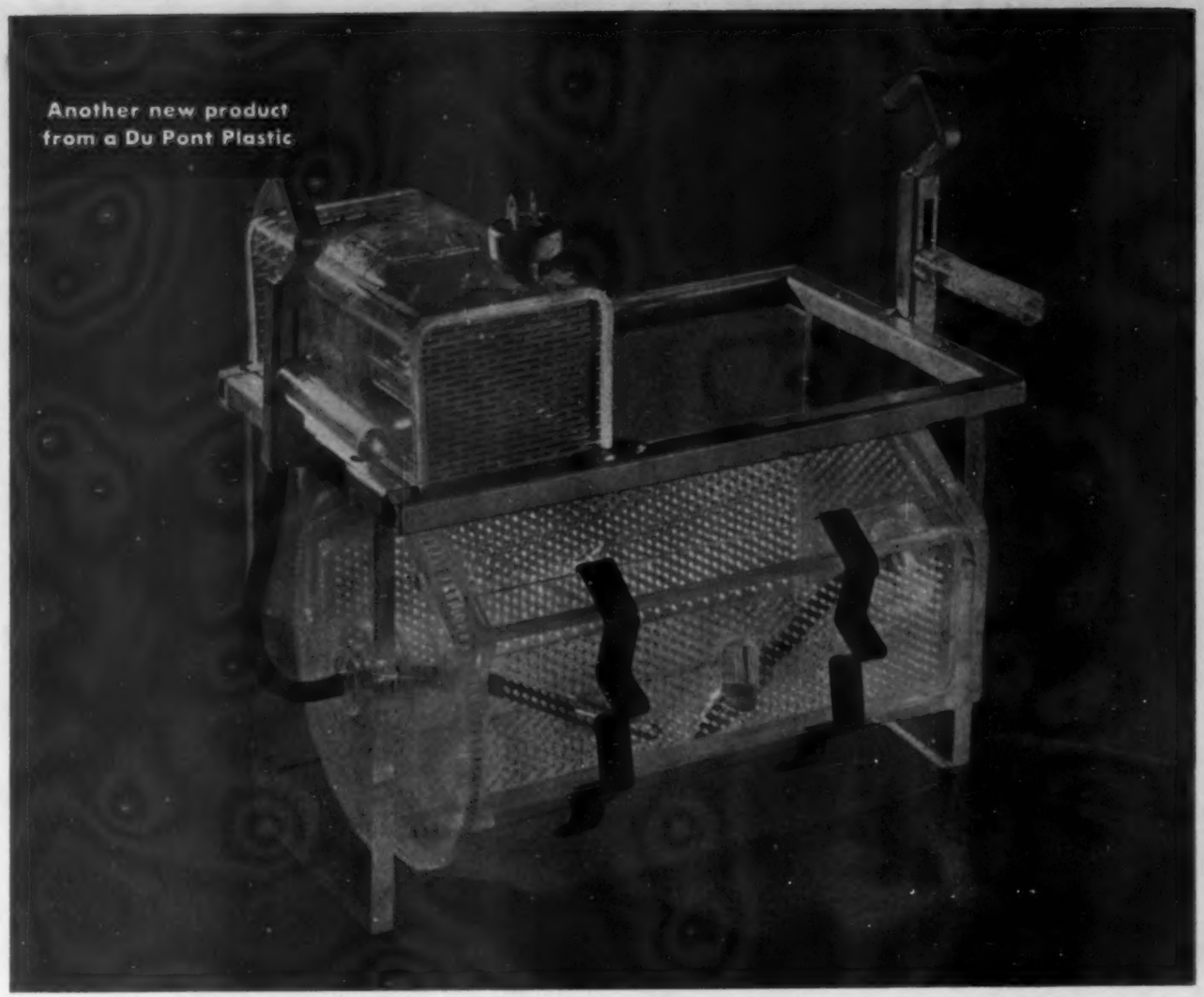
Write Today for information on the *new* line of LESTER injection molding machines . . 6-8-12-16-24 and 32 ounce models. The LESTER vertical die attachment is available for the smaller machines.

NEW YORK
CHICAGO
CLEVELAND
CINCINNATI
LOS ANGELES
SAN FRANCISCO
DETROIT



INJECTION MOLDING MACHINES

Distributed by **LESTER-PHOENIX, INC.**
2621 CHURCH AVE., CLEVELAND 13, OHIO



UPS THROWING POWER... KNOCKS DOWN COST

Electroplating Barrel of Du Pont "Lucite" Boosts Plant Efficiency



Nylon aids platers too—These portable electroplating brushes have anodes beneath their Du Pont nylon bristles. They resist corrosive plating solutions, outperform brushes bristled with all other materials tested . . . cut replacement and operating costs and boost production too.

This new electroplating barrel is built on proven principles with a new design slant made possible by Du Pont "Lucite." It outpoints any similar barrel previously tested in its resistance to plating solutions . . . ease of loading and unloading...lighter weight . . . transparency . . . low electrical conductivity . . . extreme durability and long life.

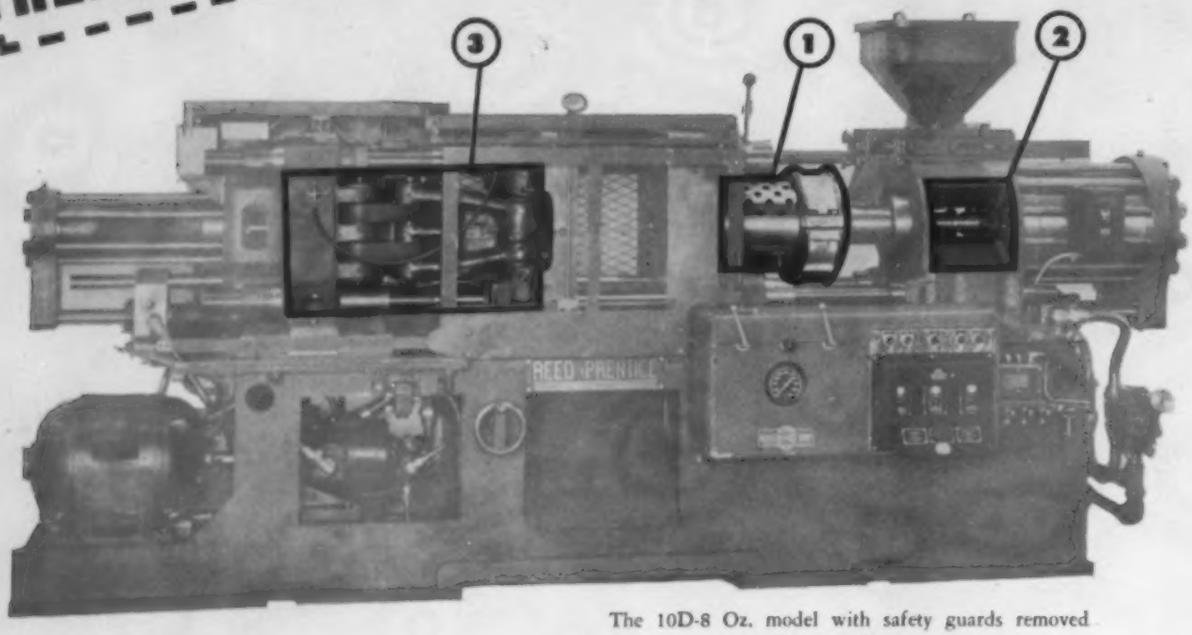
Here's an example of how the many excellent properties of Du Pont "Lucite" acrylic resin combine in an important industrial product to return more service per dollar of investment. Look to "Lucite"...and other Du Pont plastics...for improving existing equipment and for planning the new. Write for literature. E. I. du Pont de Nemours & Co. (Inc.), Plastics Department, Room 363, Arlington, N. J.

"Lucite" plating barrel made by the Hardwood Line Company, Chicago, Ill.

DU PONT
REG. U. S. PAT. OFF.
Plastics
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

No. 1 of a Series

HERE'S WHY . . . YOU GET PERFECTLY FILLED CAVITIES with REED-PRENTICE Plastic Injection Molding Machines



The 10D-8 Oz. model with safety guards removed to illustrate features.

1 HIGH PLASTICIZING EFFICIENCY OF HEATING CYLINDER

Stainless steel scientifically designed heating cylinder is electrically heated and thoroughly controls plasticizing of material before injecting into the mold. Temperature is controlled through thermocouples and pyrometer controllers. Molds are completely filled without the appearance of cold spots or burned material because of extra chamber capacity and the streamlined path through which the material passes.

2 FAST ACTION OF INJECTION PLUNGER

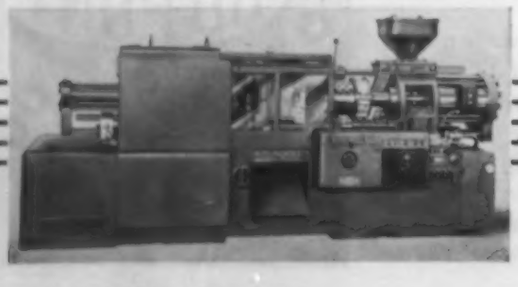
Full volume of both pumps is delivered to the injection plunger, resulting in rapid and full delivery of material to the mold. This pressure may be instantly adjusted to suit requirements.

3 MOLD CLOSING PRESSURE

Double shear link mechanism produces a greater actual locking pressure of 250 tons. Mechanism is constructed of strong electric steel members and special steel alloy toggle pins operating in hardened steel bushings. The entire toggle end of machine is adjustable through rack and pinion, permitting adjustment of molds. Slotted adjusting nuts on tie bars provide individual adjustment, eliminating flash due to untrue die surfaces.

These three superior features are only a few of many which make Reed-Prentice machines your best buy in molding equipment. Write Dept. D for full information about the complete line — 4, 6, 8, 12, 16, or 22 Oz. capacities.

THE WORLD'S LARGEST MANUFACTURERS OF INJECTION MOLDING MACHINES



INJECTION MACHINES

REED-PRENTICE CORP.

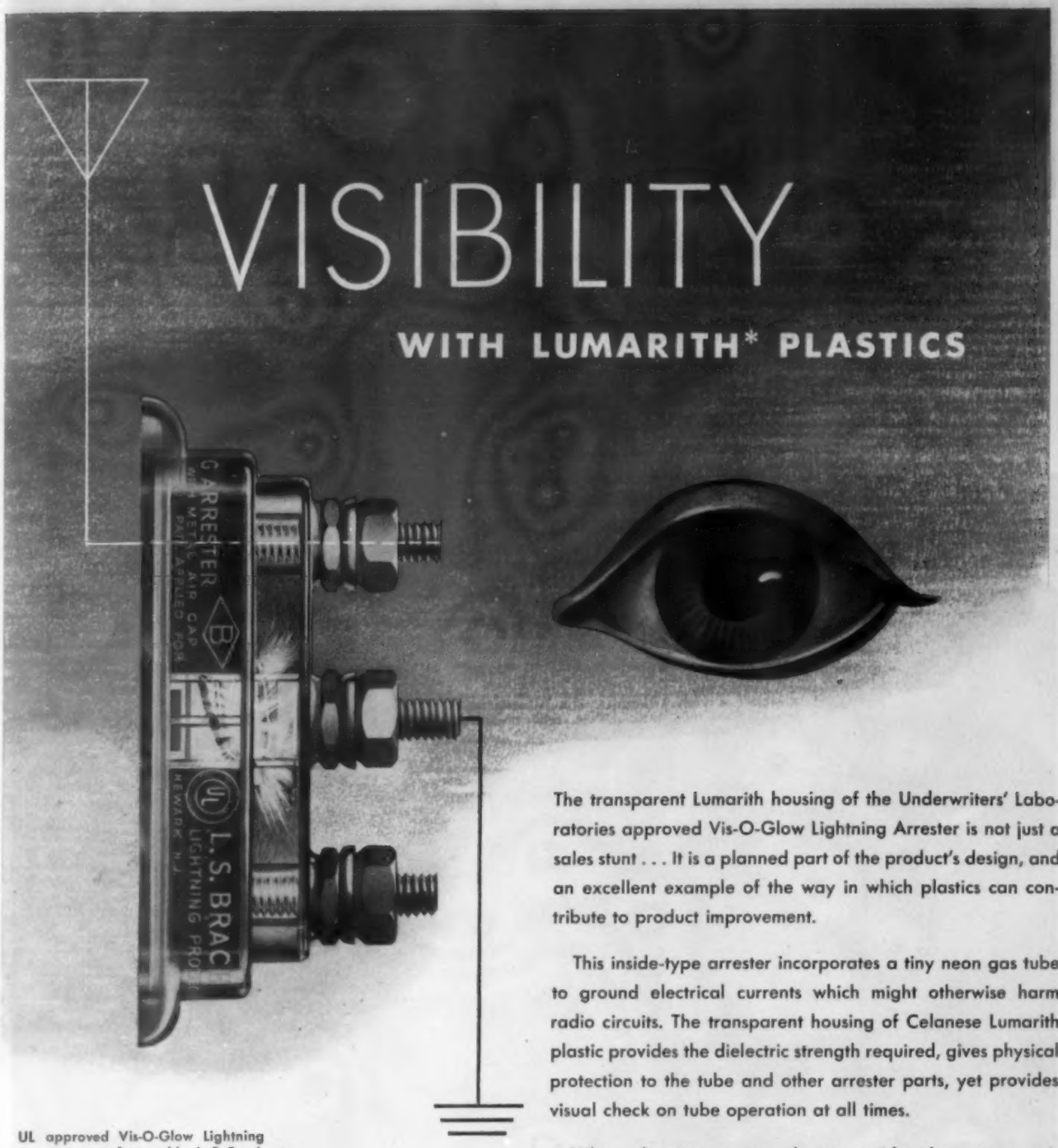
WORCESTER, MASS., U.S.A.

NEW YORK OFFICE: 75 West St., New York 6, N. Y.

CLEVELAND OFFICE: 1213 W. 3rd St., Cleveland 13, Ohio

VISIBILITY

WITH LUMARITH* PLASTICS



The transparent Lumarith housing of the Underwriters' Laboratories approved Vis-O-Glow Lightning Arrester is not just a sales stunt . . . It is a planned part of the product's design, and an excellent example of the way in which plastics can contribute to product improvement.

This inside-type arrester incorporates a tiny neon gas tube to ground electrical currents which might otherwise harm radio circuits. The transparent housing of Celanese Lumarith plastic provides the dielectric strength required, gives physical protection to the tube and other arrester parts, yet provides visual check on tube operation at all times.

When planning new products, consider the extra possibilities for improvement through plastics. It is the job of the Celanese Technical Service Staff to bring these to your attention—to furnish previews of plastics performance that will suggest economies and shortcuts. And remember, a product benefits most from plastics if the right formulation is written into its specification. Plastics Division of Celanese Corporation of America, 180 Madison Avenue, New York 16, N. Y.

*Reg. U. S. Pat. Off.
†Trademark

UL approved Vis-O-Glow Lightning Arrester, manufactured by L. S. Brach Manufacturing Corp., Newark, N. J.

Injection molded of Lumarith by Sterling Plastics, New York

Celanese* Plastics

LUMARITH* FORTICEL* CELCON† CELLULOID* VIMLITE*

Higher Quality Molding BY INTERNATIONAL
FOR MODERN APPLIANCES*



By the use of our Injecto-Compression* method of transfer molding, we are able to get much faster production per hour and a lower finishing cost. We are well equipped for large dimensional jobs for volume production with or without lacquering and coloring.

Typical production jobs illustrated are based on various materials—phenolic, urea, methacrylate to meet specific needs. We have transfer, compression, and injection equipment, a complete die shop, and an Engineering Department to solve your problems. We invite your inquiries.



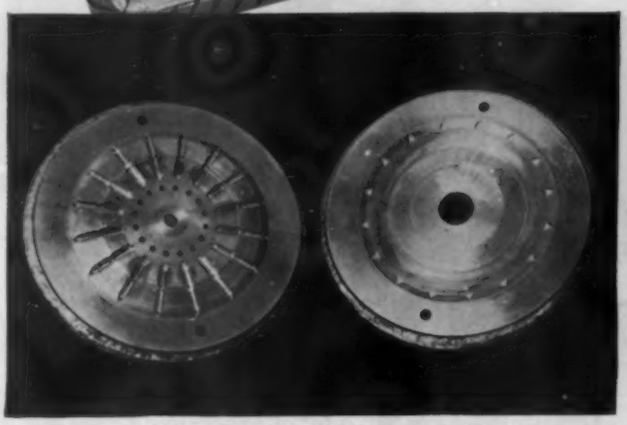
INTERNATIONAL MOLDED PLASTICS, INC.

4387 West 35th Street, Cleveland 9, Ohio

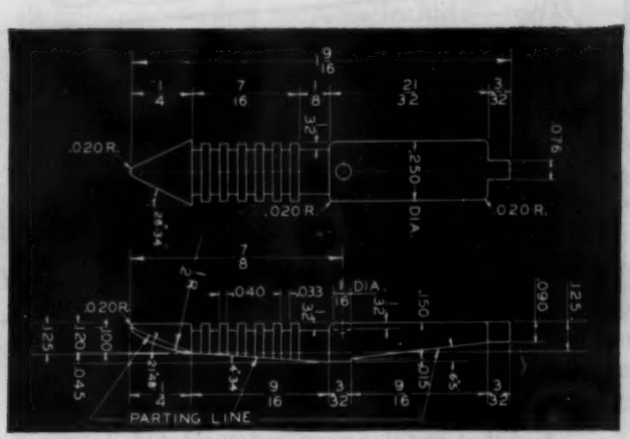
Chicago office: 20 N. Wacker Drive. Phone: Andover 5620 • New York office: 1270 Broadway. Phone: Pennsylvania 6-3290
Detroit office: 2-244 General Motors Bldg. Phone: Madison 6300 • Philadelphia office: 941 Drexel Bldg. Phone: Walnut 3544
St. Louis office: 718 Lauderman Bldg. Phone: Garfield 2464



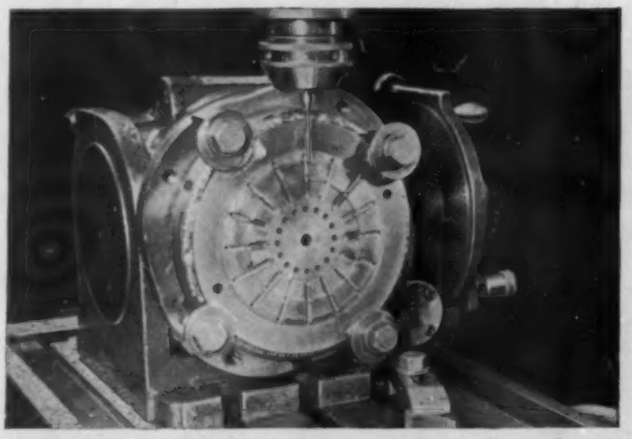
How to Mill an intricate 16-Cavity Injection Mold complete.. averaging 8¾ hours per cavity!



FAST! Both halves of this 16 cavity injection mold for an ink feed part for desk pens milled complete and ejection pin holes spotted in 140 hours! That's typical performance of a Kearney & Trecker — Milwaukee Model 2D Rotary Head Milling Machine on difficult mold making jobs.



DIRECT! These multiple contours were transmitted direct from print to mold block. No fussing with templets or models. One cavity accurately located and each operation successively duplicated after indexing on a dividing head. That's the Rotary head method of "multiple origination."



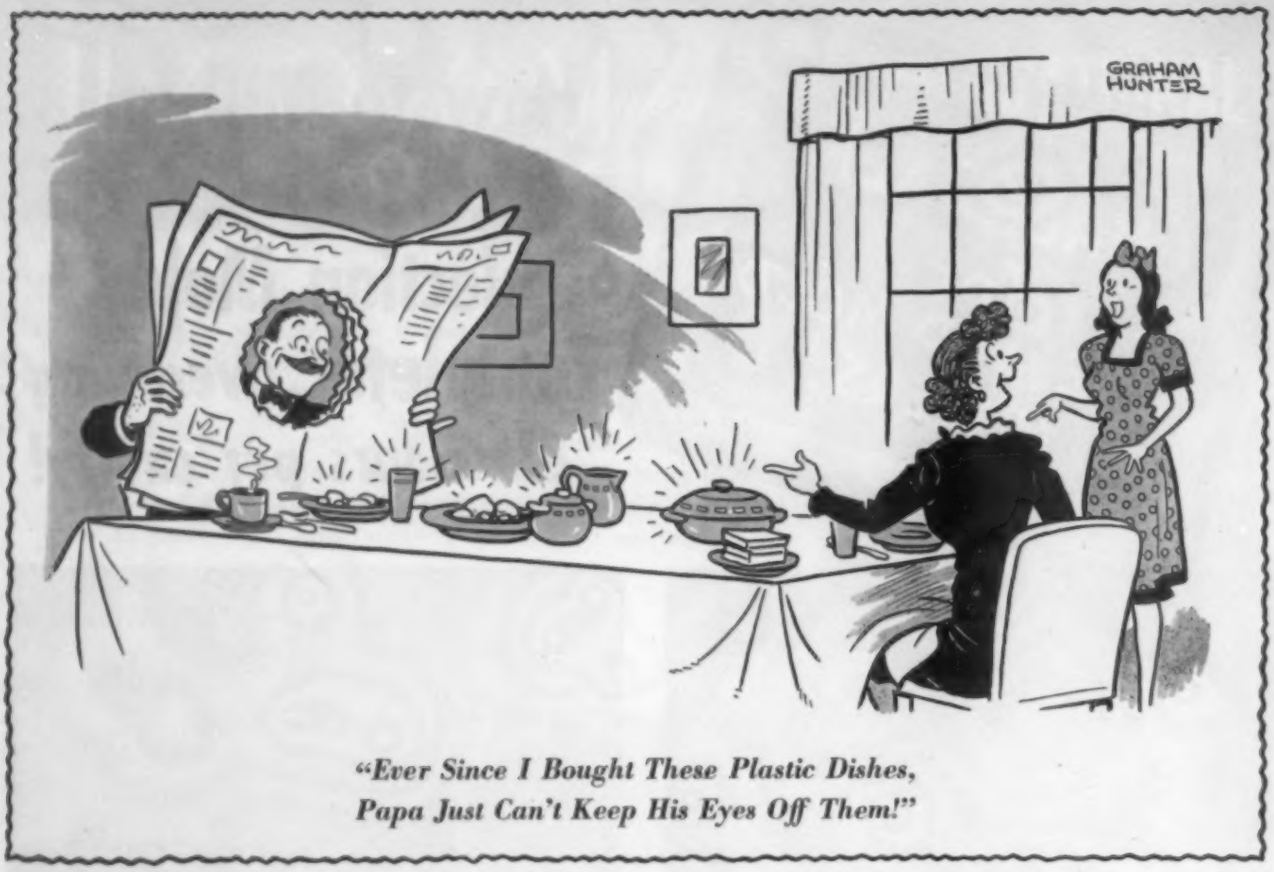
ACCURATE! Single setup reduced chance for error. Operator relied on built-in precision control and measuring devices for precise end results. Ejector half tipped 90° and special cutter used to square groove corners.

Job Data Courtesy of Sengbusch Self Closing Inkstand Company



For more facts of how you can get Fast, Direct, Accurate results on other mold, tool, die, pattern, toolroom and general production work, using the Rotary Head Method, write for bulletin 1002C on the Model 2D Rotary Head Milling Machine.

KEARNEY & TRECKER CORPORATION
MILWAUKEE 14, WISCONSIN 4718



"Ever Since I Bought These Plastic Dishes,
Papa Just Can't Keep His Eyes Off Them!"

And that goes for *your* customers, too. They not only won't be able to keep their eyes off your plastic products, but they won't be able to resist buying them—provided you arrange to use a good molder.

Modestly, of course, we're referring to Boonton. And, we'll even be so bold as to suggest that you try us for the next plastic parts you need.

Actually, we have had a lot of experience (more than 25 years) in the field of plastic molding—both injection and compression, so that when you come to us, you're buying more than just molded parts. You're buying the services of a group that knows the ins and outs of this game—has molded successfully with most of the raw plastic materials, using most methods.

If it can be Molded, Boonton can Mold it—We Hope

BMCD

SPI SOCIETY OF THE PLASTICS INDUSTRY

FOR OVER 25 YEARS
CUSTOM ENGINEERS
OF MOLDED PLASTICS

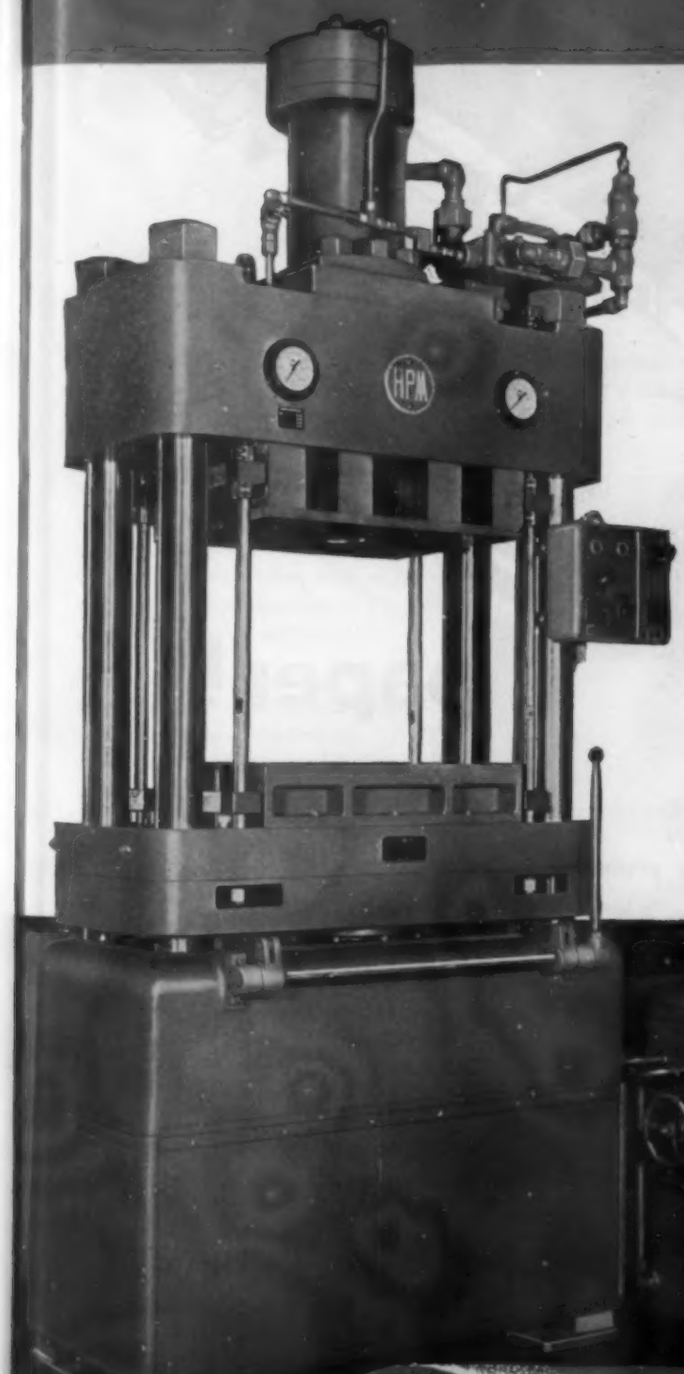
BOONTON MOLDING COMPANY

MOLDERS OF MOST PLASTICS BY MOST METHODS

122 EAST 42nd ST., NEW YORK 17 · SUITE 1716-M MURRAY HILL 6-8540

FACTORY—BOONTON, New Jersey

H-P-M *All-Hydraulic* PRESSES FOR PRODUCTION MOLDING PLASTICS AT A PROFIT !



Self-contained H-P-M compression presses are designed for economical mass production of thermo-setting parts. Completely automatic, except for loading and unloading molds, their outstanding operating features include—rapid mold closing, automatic slow-down, adjustable slow-close, breathing, rapid mold opening and automatic ejection. Presses are arranged for operation of semi-automatic molds equipped with knock-outs. Press head is designed to accommodate transfer ram (optional extra). No additional pumps are required to operate transfer ram.

There is an H-P-M press for every production molding requirement. All pumps, valves and controls are designed and built by H-P-M, guaranteeing you undivided responsibility. For high production at low cost, choose H-P-M "All-Hydraulic" presses.

THE HYDRAULIC PRESS MFG. CO.
1000 Marion Road
Mount Gilead, Ohio, U. S. A.

Branch offices in New York, Philadelphia, Cleveland, Cincinnati, Detroit and Chicago.
Representatives in other Principal Cities.



Write today for free copy of Bulletin 4702 describing H-P-M "All-Hydraulic" presses for compression molding.

HPM

Self-Contained-All-Hydraulic
MOLDING PRESSES

REVOLUTIONIZING PRODUCTION WITH HYDRAULICS SINCE 1877

YES!
we actually



STRETCH
paper!

The extreme light weight of our XFL saturating paper actually produces miles, not feet, per ton. Only weighs 1½ pounds per thousand square feet per point of caliper. (Example—caliper .020 weighs 30 pounds per thousand square feet.) Specifically recommended for latex saturation for the manufacture of artificial leather, etc., because of its uniformity, extreme softness and flexibility. Also recommended as a base or core stock for plastic impregnation where a sheet for post forming, scoring or punching is required.

Write for samples and prices.

"XFL" SATURATING

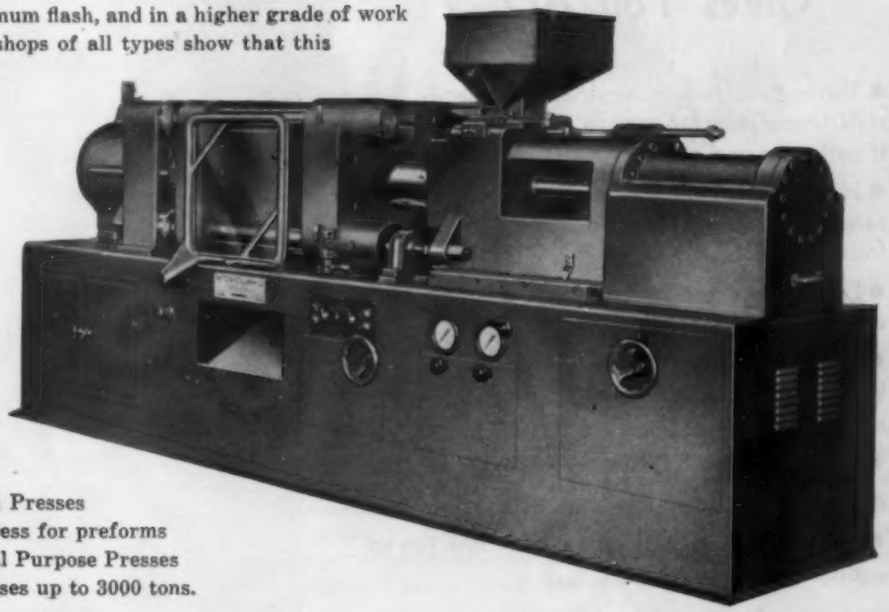
Originators • Developers

HUMMEL-ROSS FIBRE CORPORATION

Hopewell, Virginia, U. S. A.

NOW! AVAILABLE... FOR PROMPT SHIPMENT!

THE Watson-Stillman 12-ounce Horizontal Injection Molding Machine is establishing new records in productivity, in fewer rejects, in minimum flash, and in a higher grade of work — enthusiastic reports from molding shops of all types show that this machine is doing an outstanding job.



Years of experience have gone into the building of W-S molding equipment, insuring a maximum simplicity of operation with a minimum of maintenance and assured customer satisfaction.

The Watson-Stillman Company's line of plastic molding equipment is the most complete line of all-hydraulic molding machines now being made. This line includes 8 to 80-ounce Horizontal Injection, 1 and 4-ounce Vertical Injection Machines; Transfer and Compression Presses up to 1200 tons; 100 Ton Tableting Press for preforms up to 5" x 2"; Laboratory and General Purpose Presses up to 200 tons, and Die Hobbing Presses up to 3000 tons.

For details on any machine in Watson-Stillman's complete line, write or call Watson-Stillman today!

2487

WATSON-STILLMAN
HYDRAULIC MACHINERY DIVISION

FACTORY AND MAIN OFFICE
ROSELLE, NEW JERSEY

BRANCH OFFICES
PHILADELPHIA, PA. • CHICAGO, ILL.

REPRESENTATIVES

BUFFALO, N. Y. . . . . Industrial Equipment Co.
CHICAGO, ILL. . . . . E. L. Essley Machinery Co.
CLEVELAND, O. . . . . Frank T. Goetz Machinery Co.
DALLAS, TEX. . . . . Perry Machinery Co.
DETROIT, MICH. . . . . Peninsular Machinery Co.
DULUTH, MINN. . . . . Anderson Machine Tool Co.
GRAND RAPIDS, MICH. . . . E. L. Essley Machinery Co.
HOUSTON, TEX. . . . . Perry Machinery Co.
INDIANAPOLIS, IND. . W. K. Millholland Machinery Co.
LOS ANGELES, CAL. . . . . Hoffman and Heartt
MILWAUKEE, WIS. . . . . E. L. Essley Machinery Co.
NEW YORK, N. Y. . . . Eastern Railway Supplies, Inc. (R. R. Equip.)
PITTSBURGH, PA. . . . . Stanley Berg & Co.
ROCHESTER, N. Y. . . . . Industrial Equipment Co.
SAN FRANCISCO, CAL. . . . Jenison Machinery Co.
ST. PAUL, MINN. . . . . Anderson Machine Tool Co.
SYRACUSE, N. Y. . . . . Industrial Equipment Co.
TULSA, OKLA. . . . . Perry Machinery Co.
WASHINGTON, D. C. . . . Ralph Payne (R. R. Equip.)

CANADA: Canadian Fairbanks-Morse Co., Ltd. • Branches in All Principal Cities
Foreign Sales Representatives: OMNI PROCUCTS CORP., 40 East 34th Street, New York 16, N. Y. Correspondents Throughout the World

MANUFACTURERS OF THE MOST COMPLETE LINE OF HYDRAULIC MACHINERY

If You Print On Plastics Demand These 7 Features in Your Leaf Stamping Machine...

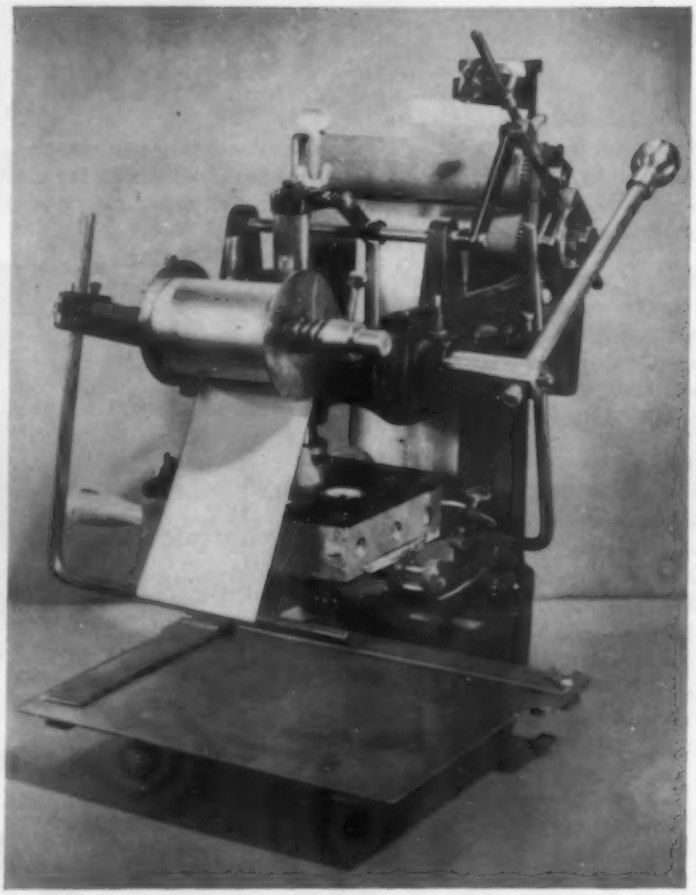
New Hot Press Leaf Stamping Machine Gives You ALL 7

- Thermostatic heat control assures exactly the right temperature for any job. This is imperative if perfection and economy are to be obtained.
- Heavily knurled, self-setting feed rolls give sure pull. No slipping—no waste. Adjustable from 0" to 5½".
- Lock handle for instant height adjustment of die or type up to 8".
- Self centering type holder palate will take up to 4" X 6". Die holder palate will take larger die.
- 2 way adjustments for leaf guide control.
- Leaf roll widths up to 6".
- Sliding bed for quick change from one job to another.

Available If Desired

Pedal for foot operation.

Dial tables.



Always complete stocks of leaf, foils, type, dies and accessories.

Impression Products

A DIVISION OF **STAMP RITE** INC.

170 BROADWAY • N. Y. 7 • RE 2-0823-4-5



4-WINGED DRIVER CAN'T SLIP OUT OF PHILLIPS TAPERED RECESS





RADIO
Builders and Listeners ...Both Give Top Rating

to these Cost-Controlling, Good-Looking AMERICAN PHILLIPS SCREWS

1. TOP RATING in Production Savings: Fast, fumble-proof, automatically straight-driving . . . American Phillips Screws make possible high-volume radio production where even the slightest surface-scratch means "reject." For at highest speeds, the 4-winged American Phillips Driver can't twist out to scar work-surfaces! *Speed . . . with complete safety both for work and workers . . .* that's the double advantage that makes American Phillips Screws the *lowest-cost fastening method on any job.* Whatever product *you* assemble, you will find that American Phillips Screws pay off with SAVINGS UP TO 50%.

2. TOP RATING in Sales Promotion: The decorative heads of American Phillips Screws are a customer-accepted mark of quality. And they're an added assurance of serviceability under incessant use. So standardize on American Phillips Screws throughout your assembly departments. Write:

AMERICAN SCREW COMPANY, PROVIDENCE 1, RHODE ISLAND
Chicago 11: 589 E. Illinois St. *Detroit 2:* 502 Stephenson Building

AMERICAN PHILLIPS *Screws*



ALL TYPES
ALL METALS: Steel, Brass, Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)

DETROIT PUBLIC LIBRARY



Writing with your voice

Years ago Alexander Graham Bell dreamed of "a machine that should render visible to the eyes of the deaf, the vibrations of the air that affect our ears as sound." He never realized that dream, but his researches led to the invention of the telephone.

Today Bell Telephone Laboratories have turned the dream into a fact — translating the spoken word into readable pictures.

By this new invention of the Laboratories, the talker speaks into a microphone. Vibrations of the voice are unraveled through electronic circuits, and then are reassembled as luminous patterns which travel across a screen. Each syllable of sound has a distinctive shape and intensity.



Science unravels speech

Visible speech is still in its infancy, and is not yet available to the public. But educators of the deaf are now evaluating it. Indications are that the deaf can learn to read the patterns and, by comparing the patterns their own voices make with the patterns of correct speech, can improve their diction.

Patterns of visible speech also provide a means for analyzing and recording sound in the study of phonetics and of languages. Eventually, visible speech may make possible visual telephony for the deaf.

This is but one of many contributions by Bell Telephone Laboratories to the understanding and control of sound.

BELL TELEPHONE LABORATORIES *EXPLORING AND INVENTING, DEVISING AND PERFECTING FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE*

. . . the proof of the Plasticizer is in the DRAPE*



*The proof of the plasticizer is in the DRAPE— that quality of hang, softness, "hand", imparted to unsupported films and coated fabrics by the incorporation of BAKER PLASTICIZERS. Our Technical Service Staff will be glad to help you solve your plasticizer problems.

THE BAKER CASTOR OIL COMPANY

Established 1857

120 Broadway, New York, N. Y.

Chicago, Illinois • Los Angeles, California

RESINS

for ABRASIVE PRODUCTS

Grinding Wheels: 1364, 2731, 1015-3025 Solid (Powdered) 8121, 3014 Liquid

Abrasive Discs: 1045, 2838 Liquid (Water Dilutable)

for INSULATING VARNISHES

Heat Reactive: 901, D145, 7424 Solid (Lump) D148-W641, 2126 Solid (Lump or Crushed)

Permanent Fusible: 836, 250 Solid (Lump)

for FRICTION MATERIALS

Brake Linings and Clutch Facings: 6334, 7627, 9111, 5477F, 5475 Solid (Powdered) 6106, 7200, 9815 Oil Modified Phenolic (Powdered) 985 Oil Soluble (Lump) 9639, 9685, Oil Modified (70% - 85% Solids) 1350 Plasticized Phenolic (Liquid) D169 Resin Solution

for PROTECTIVE COATINGS

Oil Soluble: 250, 836, 250F, 2217, 1820, D148 Pure Phenolic. 40-43 Modified Phenolic

Heat Curing: 5476, 2896A Resin or Solution (70%)

for COATING & IMPREGNATING

Laminating Varnishes: 3070, 2160, 1524 Resin Solution (60% Solids) 2686 Resin Solution (70% Solid)

Water Soluble Resins: 575, 2801, 3257 Liquid (70%-80% Solids) 1412 Liquid (70% Solids)

for BINDERS

Cork Sheets: 1900, 2111, 2954 Plasticized Phenolic (Liquid 70-100% Solids)

Glass and Mineral Wool: 2801, 1292, 3330 Liquid (Water Dilutable)

VARCUM
CHEMICAL CORPORATION
NIAGARA FALLS, NEW YORK

* RICHARDSON MEANS *Versatility* IN PLASTICS



This is where the Base gets the "Business"!

This is the bath in resin . . . the saturation that sets the pace for other things to come. If the control is good . . . and we make sure it is at Richardson . . . your Laminated INSUROK sheets, rods and tubes are well on their way to perfection.

This is as it should be. And maybe this Richardson brand of determination is what has helped us to develop, among many others, Laminated INSUROK T-725. This grade has uniformly low moisture absorption and high insulation resistance under humid conditions. With proper technique, intricate parts can be successfully fabricated. Get the full story. It's interesting!

INSUROK *Precision Plastics*



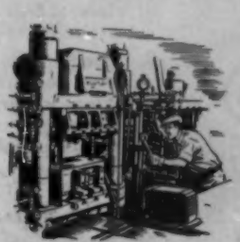
***RESEARCH**
. . . a continuous transformation of possibilities into practical ideas in plastics.



***DESIGNING**
. . . Artistic visualization. Creative engineering. Practical planning for efficient plastics production.



***PRODUCTION**
. . . Complete machine shop facilities for manufacturing our own dies, molds, tools.



***MOLDING**
. . . Rubber and bituminous plastics; and synthetic resin plastics . . . Beetle, Bakelite, Durez, etc.



***FABRICATING**
. . . Complete equipment for drilling, punching, sawing, turning, milling, etc.

The RICHARDSON COMPANY

Sales Headquarters: MELROSE PARK, ILL. FOUNDED 1858 LOCKLAND, CINCINNATI 15, OHIO

Sales Offices

W YORK 6, 75 WEST STREET
LADELPHIA 40, PA., 3728 NO. BROAD STREET
EVELAND 15, OHIO, 326-7 PLYMOUTH BLDG. • DETROIT 2, MICH., 6-252 G. M. BLDG. • ST. LOUIS 12, MO., 5579 PERSHING AVENUE
ROCHESTER 4, N. Y., 1031 SIBLEY TOWERS BLDG.
MILWAUKEE 3, WIS., 743 NO. FOURTH STREET

Factories: MELROSE PARK, ILL. • NEW BRUNSWICK, N. J. • INDIANAPOLIS, IND.

Announcing

A RADICALLY NEW

for DESPATCH OVEN

HYDRO-THERM PREHEATING

Designed to allow use of the newly-developed heat-plus-steam process to provide NEW ease, convenience and economy in transfer and compression molding.



Despatch PTVDS-12 Oven with preforms in drawers. Inset shows how operator holds heated preforms before loading press.

Here's something really new in preheating equipment—a DESPATCH "Hydro-Therm" Oven! Designed to handle 30 to 40 lbs. of preforms at one time, this convenient, fast-heating oven uses steam with forced convection . . . **accomplishes some results impossible to obtain with other preheating methods.**

Typical Advantages

1. Reduces molding costs. Gives results approximately equal to dielectric preheating, yet *saves up to 80% in equipment costs* and requires hardly any maintenance . . . permits easy transfer molding of unusually large articles (see photo) without excessively large presses or preheating equipment . . . allows use of off-grade and harder materials . . . prolongs mold life.

2. Allows lower transfer pressures, sometimes as low as 60% to 75% of that required with dielectrically preheated material. Oven's hot, moist atmosphere preconditions and lubricates material . . . greatly accelerates flow . . . gives good finish . . . allows easier release of parts from mold.

3. Permits 25% lower preheating temperatures than with dry heat, under most conditions. Steam uniformly softens material, speeds heat penetration. (In one test steam preheated asbestos-filled preforms at 180° F. internal temperature were soft enough for transfer molding, while dry-heated preforms at same temperature were far too stiff.)

4. Accelerates curing. Repeated tests show large and small sectioned parts cure as fast or faster than with dielectric preheating. (In one case steam preheat accomplished a better cure, determined by acetone extraction, in 30 seconds than dielectric preheating did in 1½ minutes; ultimate cure was also better.

WRITE TODAY for details about **SPECIAL RENTAL OFFER!** Test a Despatch Hydro-Therm Oven in your own plant.

DESPATCH OVEN CO., 609-13 S.E. 8th St., Minneapolis 14, Minn.

Typical Application

PREHEATING 10½-LB. CHARGES FOR TRANSFER MOLDING; 3½ MIN. CURE CYCLE

At Sperzel, Minneapolis, this 12-drawer Despatch "Hydro-Therm" Oven preheats 10½-lb. charges of phenolic material for transfer molding of two complete toilet seats (each 1 1/16" thick) at the same time. Material transfers in about 22 seconds . . . cures in approximately 3½ minutes or less. Specially-designed 350-ton Rodgers angle-frame press has four transfer rams.

Steam saturated chamber of the Despatch "Hydro-Therm" Oven preheats and softens material at 220° to 250° F. Each drawer accommodates 18 three-ounce preforms (average weight) or total oven load of about 40 lbs.

Typical features: Automatic heat control; wide range, 100° to 400° F.; uniform forced draft heat flow. Steam control valve. Quick-release device for allowing instant bunching and removal of heated preforms. Indicating controls. NOTE: This is a dual purpose oven for "Hydro-Therm" or standard forced convection pre-heating. Closing steam valve converts oven to "dry heat" operation.

DESPATCH
OVEN COMPANY

Engineers and manufacturers of
America's most complete line of plastic processing ovens
for PREHEATING · DRYING · CURING · AFTER-BAKING
TYPES AND SIZES FOR ALL REQUIREMENTS







Mother's Helpers...

That term has been given new meaning by the development of time saving household appliances during the past score of years. Now, plastics . . . many of them developed by Michigan Molded engineers . . . are still further increasing the utility and beauty of home products.

With years of broad experience in this field, Michigan Molded engineers and production technicians can be of major assistance in developing custom plastic parts and accessories. Michigan Molded can do it better . . . faster . . . at lower cost.

If you make: Refrigerators, Vacuum Cleaners, Toasters, Irons, Percolators, Dishwashers, Washing Machines, Clocks, Can Openers or Kitchen Utensils — DEPEND ON Michigan Molded Plastics Quarter-century of plastic experience.

MICHIGAN MOLDED PLASTICS, INC.

DEXTER, MICHIGAN



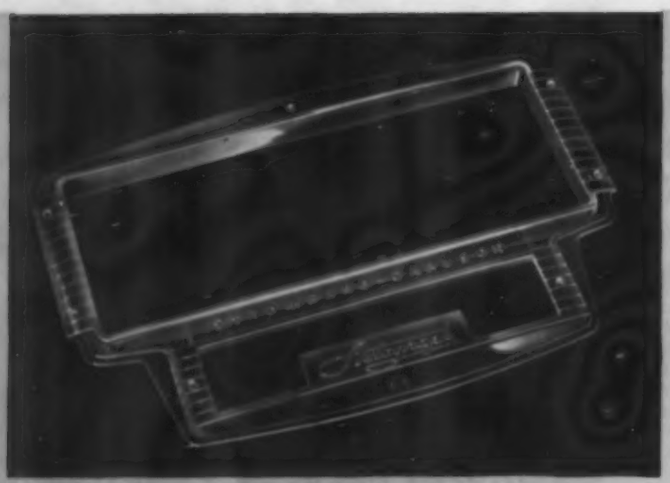
design with

RIGHT—in ornaments!

For low-cost ornamental "jewels", Styron is the plastic with the inherent sparkle, the exceptionally high index of refraction. It takes only fast, easy molding—no cutting and little finishing—to turn out costume jewels that look surprisingly like precious stones. Styron has excellent visual depth, and color in full range, for fine ornamental effects. And Styron lends itself to producing a maximum number of pieces per pound—*per dollar!* For better ornaments, and better economy—better work with Styron.



Ask most any Molder!



RIGHT—in radios!

Clearly a job for Styron! Wherever brilliant transparency will step up sales appeal—as in this handsome radio dial frame—designers think in terms of *low-cost* Styron . . . especially in intricate parts that must keep their shape and beauty through any kind of handling. Only a strong, *rigid* material like Styron can give these fine results in so *thin* a molding. Notice the clear-cut reproduction of the name: the mark of quality in a part so economical to produce.

They're doing big things with Styron today! This No. 1 Plastic, produced by Dow, is improving product quality . . . cutting costs . . . in widely diversified fields. And manufacturers are profiting from Styron's unusual lightness, its ability to yield more pieces per pound. Mention Styron to your plastics molder—he'll tell you how you can best apply its exceptional benefits to your own products. Your molder will be glad to arrange a planning conference with Dow plastics experts. Dow—and the molder—will work with you. Call the nearest Dow office, if you like—or ask most any molder!

STYRON

THE RIGHT PLASTIC



RIGHT—in refrigerators!

Lightness plus dependability plus *economy*—Styron is *right* in refrigerators. Despite the constant moisture, the temperature changes, these parts do not swell, shrink, or crack. And large area moldings like these call for Styron's rigidity. Moreover, Styron is both odorless and tasteless. It does not affect foodstuffs or undergo change through contact with them. All these advantages come to you in a material that is the outstanding *quality* plastic priced for important savings in production costs.

STYRON USES

Lighting fixtures and displays; electrical insulation; battery cases; funnels; closures; pharmaceutical, cosmetic, and jewelry display containers; jewelry; advertising novelties; refrigerator parts; pencils, lenses; decorative objects and trim; drapery hardware; bathroom fixtures; photographic equipment; cabinet hardware; lamp finials; housings; picture frames; housewares; toys; combs; children's feeding dishes; tumblers; poker chips; radio parts; bathroom tile.

PROPERTIES AND ADVANTAGES

Beautiful, clear, transparent to opaque; resistant to acids and many alkalies; stable at low temperatures; excellent electrical properties; broad color range; low specific gravity, providing more moldings per pound of material; low water absorption.



Let's work it out together

Success in plastics is best measured in end products. It calls for combined efforts of manufacturers, designers, fabricators, raw material producers. Dow is ready to do its part. Save time and money—call on Dow and get the most out of plastics.

PLASTICS DIVISION • THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington • Cleveland • Detroit • Chicago • St. Louis
Houston • San Francisco • Seattle • Los Angeles
Dow Chemical of Canada, Limited, Toronto, Ontario

DOW

Plastics

STYRON · SARAN · SARAN FILM · ETHOCEL · ETHOCEL SHEETING

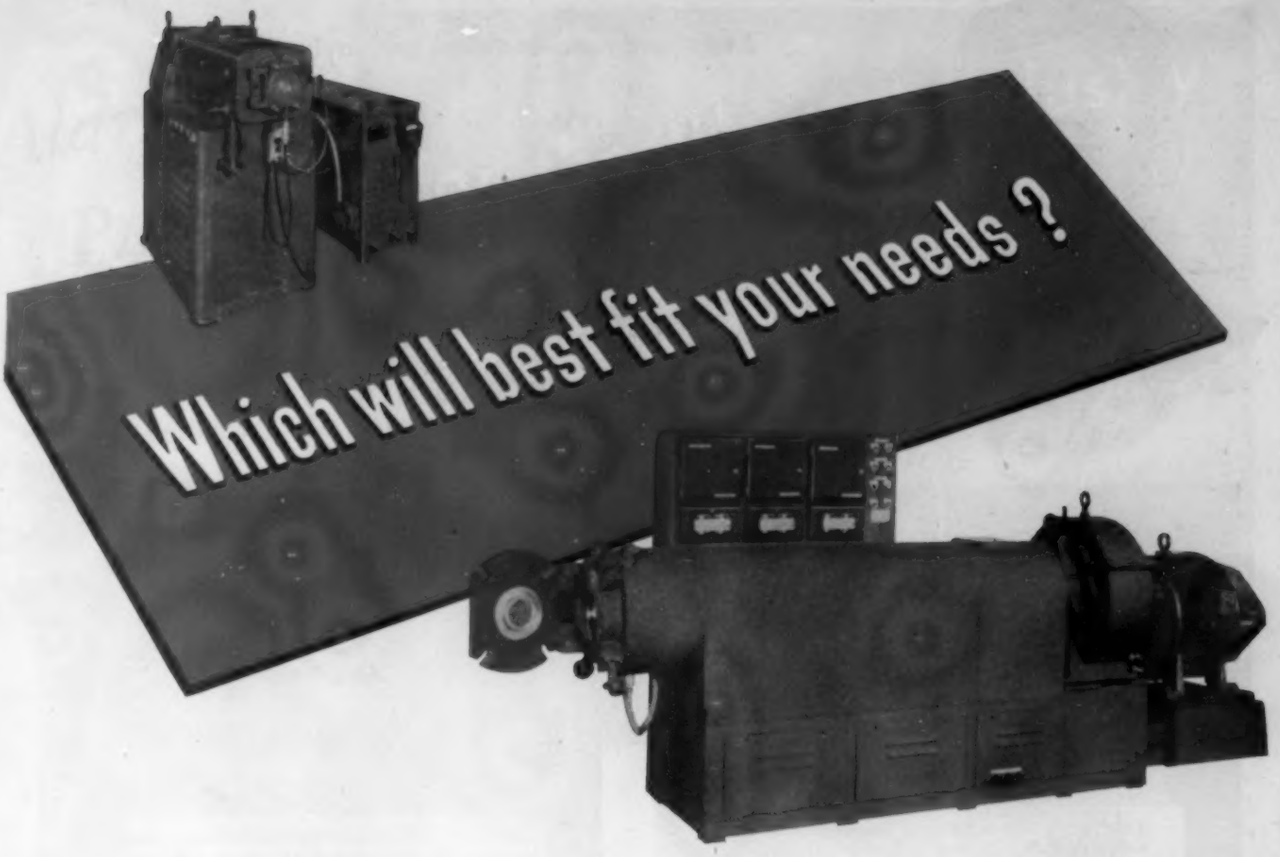


for finer plating on plastics

SPECIFY PLASTIPLATE! Thru our exclusive plating processes, plastic buttons, jewelry, umbrella handles, bottle caps, chains, novelties, etc., are transformed into magnificent gold and silver products. The beauty, durability, and brilliance of our electroplated finishes cannot be excelled. For we have the necessary skill, experience and mass production equipment to make this possible at Low Cost.

Feel free to call on us, without obligation, for any of your plating problems. Precision platers to your specifications. . . **Plastiplate Co., Inc., South River, N.J.**

MASS PRODUCTION AT LOW COST



ALTHOUGH each size and model extruder in the NRM line is a versatile performer, it is particularly efficient for a certain range and type of production.

For test runs, and laboratory operation on small sections and limited production, the 1″ Bench Model Extruder may be the most economical unit to operate.

For longer runs and continuous production of small tubing and similar sections the 1½″ Oil-Heated Model may prove more practical.

Still other types of extruded sections, because of size, shape, or the material used, can be better produced on larger NRM plastics extrusion equipment.

To meet these varied needs, there are 10 different model extruders in the complete NRM line. But this is only part of the story, for the design and type of screw selected for your particular requirements can mean the difference between long, continuous, trouble-free and profitable operation or slower production with less control over quality and dimensions.

The selection of new plastics extrusion equipment calls for an analysis of your present equipment and capacity, and your future production plans.

When you are considering increasing your plastics extrusion output or tooling up for new products, call on NRM engineers. You'll find their experience can help you formulate your plans for greater efficiency and greater profits.



NATIONAL RUBBER MACHINERY CO.
General Offices: Akron 8, O.

Plastics
MACHINERY DIVISION



More and more molders are saying:

"There are many advantages to MULTIWALL PAPER BAGS as containers for molding compounds"



EASY TO OPEN — Just cut looper thread at valve end of bag and pull out as shown. Then rip tape off. This leaves bag wide open, means faster emptying, less chance for contamination, fewer rejects.



EASY TO HANDLE — Multiwalls' convenient 50 lb. size is a complete charge for many molding machines. Handling is easier too; one man can stack Multiwalls as fast as two men can handle equal weight in drums.



EXTRA WORKING SPACE — A day's supply of molding compounds in Multiwalls stacks neatly and compactly alongside machines, leaving ample space for the operators. Less storage area is required because Multiwalls take 15%-20% less space than rigid containers — and *100* empty bags require only 2 cu. ft.

. . . *And* used Multiwalls bring quick cash returns!

In addition to saving material costs, space, and labor, Multiwalls give you *extra* profits because they can be readily sold to local used bag dealers. That's one more important reason why it actually pays to order your molding compounds in multiwall paper bags.



MULTIPLY PROTECTION • MULTIPLY SALEABILITY

ST. REGIS SALES CORPORATION

(Sales Subsidiary of St. Regis Paper Company)

NEW YORK 17: 230 Park Ave. CHICAGO 1: 230 No. Michigan Ave.
BALTIMORE 2: 1925 O'Sullivan Bldg. SAN FRANCISCO 4: 1 Montgomery St.

IN CANADA
St. Regis Paper Co. (Can.) Ltd.
Vancouver, British Columbia
Montreal, Quebec

Allentown Atlanta Birmingham Boston Cleveland Dallas Denver Detroit Franklin, Va.
Los Angeles Nazareth, Pa. No. Kansas City, Mo. New Orleans Ocala, Fla. Seattle Toledo

Aldrich Pumps . . . for the Plastics Industry

Molding by compression, injection and extrusion calls for ever-increasing pressures in hydraulic press operation. Aldrich has developed a number of high pressure pumps with a mechanical reliability that particularly recommends them for these highly specialized services.







The ALDRICH-GROFF Controllable Capacity Pump *(above, right)* is a variable stroke constant speed vertical triplex pump that will automatically adjust its stroke and delivery to maintain a given constant pressure in a hydraulic system from which numerous hydraulic plastic moulding presses are hydraulically operated. The arrangement for motor drive requires the minimum amount of floor space, foundation and installation expenses. Always shipped completely assembled, it is necessary only to place the unit on its foundation, connect suction and discharge lines, wire the motor, fill crankcase with lubricating oil and connect copper air tubing to stroke control diaphragm—the unit is then ready for operation. Built for all pressures encountered in the plastic moulding industry or higher, these pumps are suitable for handling hot water, soluble oil in water, or hydraulic oil.

Aldrich Inverted Vertical Triplex Pump *(above, left)*. A high pressure constant-stroke pump. Drive arrangements can be direct through gear-head motor as shown, through built-in pump gearing from extended pinion-shaft, or by chain, flat or V-belt from extended crankshaft. Can be fitted with Aldrich Patented Synchronized Suction Valve Control for services on hydraulic accumulator systems.

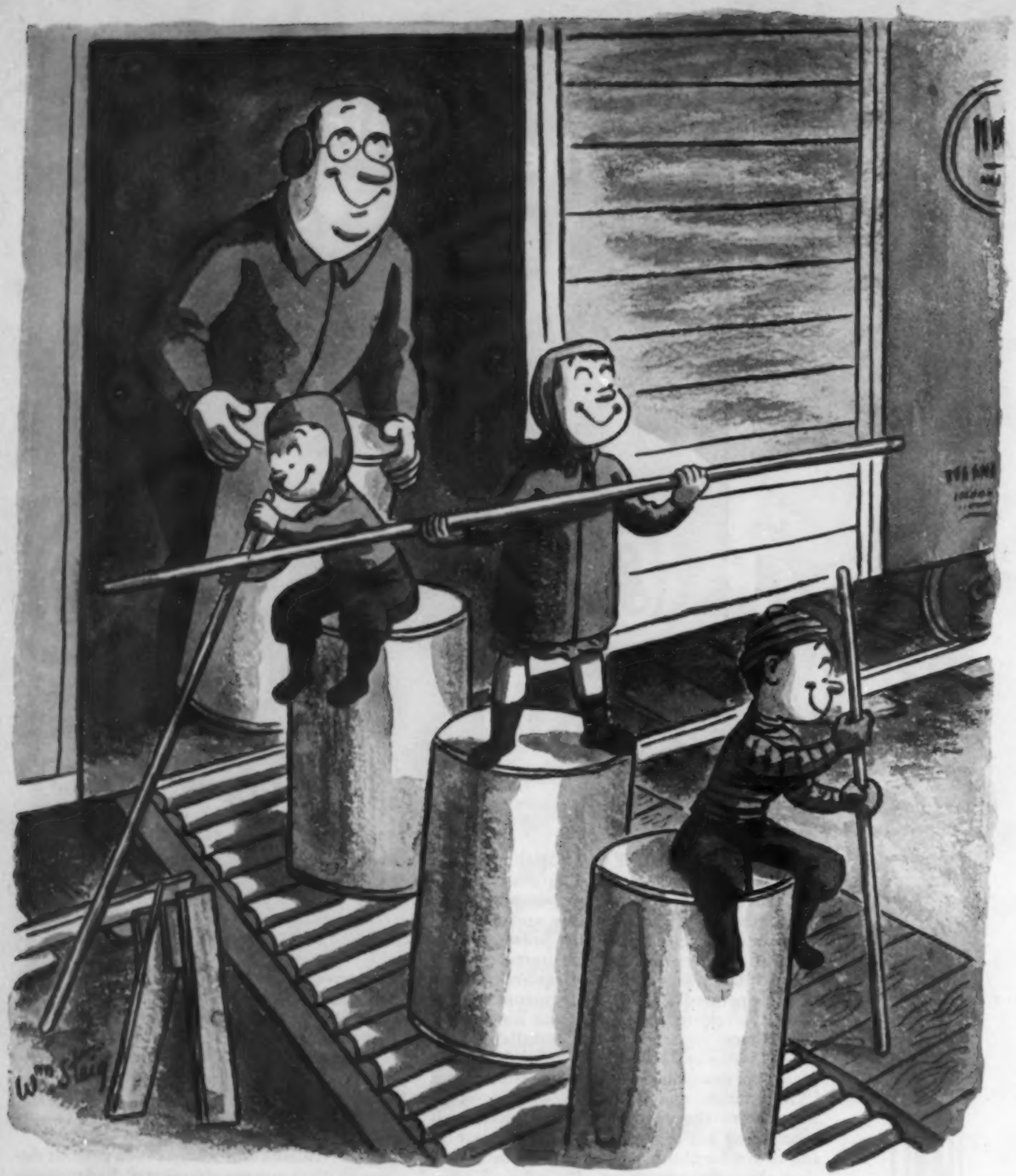
- Other Vertical Triplex Pumps with various forms of drive from 2 to 750 hp and working pressures up to 15,000 psi built for long life under the severest operating conditions.
- Also, Aldrich Accumulators in various designs to meet any requirements; hydropneumatic plunger and piston types *(shown left)*; dead weight or gravity types. Alleviators; Synchronized and non-synchronized suction valve controls.

Our engineering department will gladly consult on all pumping and hydraulic problems. Bulletins and data sheets of any type pump in the Aldrich line will be sent on request.

THE ALDRICH PUMP CO.

6 GORDON STREET
ALLENTOWN • PENNA.

Representatives: Akron • Birmingham • Bolivar, N. Y. • Boston • Chicago • Cincinnati • Cleveland • Denver • Detroit • Duluth Houston • Jacksonville • Los Angeles • New York • Omaha • Pittsburgh • Portland, Ore. • St. Louis • San Francisco • Seattle • Tulsa



"The bigger the family — the better the service"

CONTINENTAL CAN COMPANY, INC.

CONTINENTAL PAPER DIVISION

PAPER DIVISION Headquarters
330 W. 42d St., New York 18, N. Y.

MONO NESTED AND CYLINDRICAL CONTAINERS

COMBINATION PAPER-AND-METAL CANS

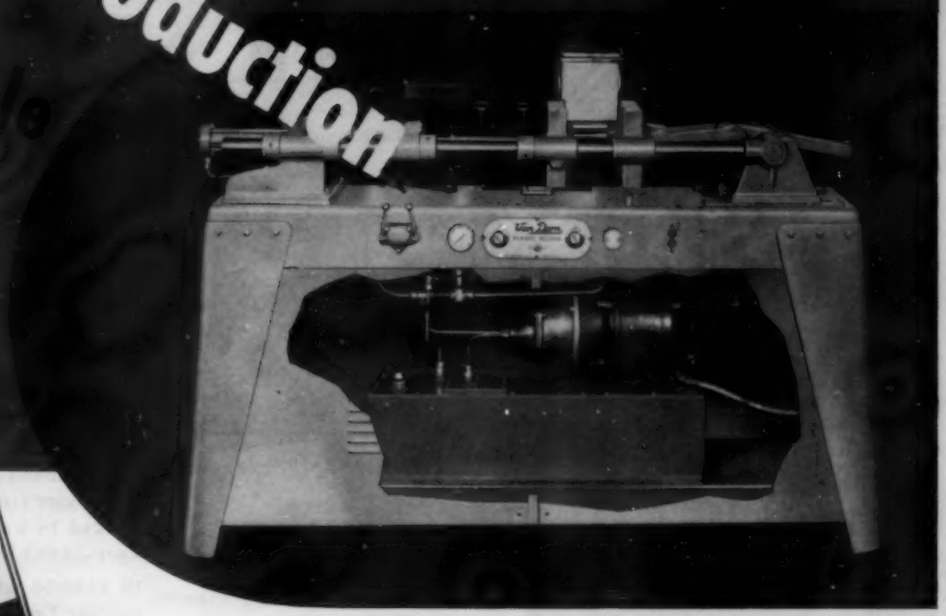
FIBRE DRUMS The Container Co., Van Wert, Ohio

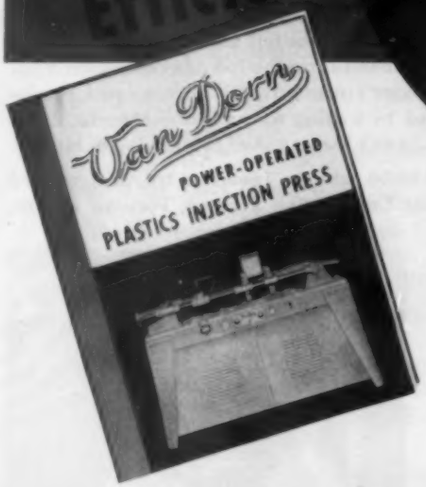
Sales offices in all principal cities

Although Continental is one of the largest producers of fibre drums in the world—we still cannot make as many as are needed. Adverse conditions have held up our ambitious plans for expanded manufacturing facilities and increased production. But when we do get rolling in high gear, you can be sure that Continental, as always, will give you not only the best in service . . . but the best in quality. Keep your eye on Continental!

PLASTICS INJECTION PRESS

Low Cost Production





Write **FOR FREE FOLDER**

which illustrates and describes the Van Dorn Plastics Injection Press and its applications.

This Van Dorn 1 oz. molder, powered by a 2 hp motor, is hydraulically operated for economical production. ● Automatic temperature control, automatic parts ejection, simple operation and low cost are a few of the advantages of the H-200 Press.

WE MAKE MOLDS for Van Dorn Presses... Proved—Tested—Ready to Run

THE VAN DORN IRON WORKS CO.

2607 EAST 79TH STREET ● CLEVELAND 4, OHIO

Local Light for Better Sight . . DAZOR ALONE *Floats!*



There's no margin for error in such critical tasks as precision machining, fine inspection, bench and assembly work. And none in drafting, accounting, bookkeeping. These jobs—and many others—demand straight seeing!

Use local light for better sight . . . Dazor *Floating* Lamps. For Dazors bring all-around *flexibility* to individual working areas, giving users full control over both the location and intensity of illumination.

A touch of the hand does it—*floats* the lamp to virtually any position where it *stays put* without further attention. This freedom of movement results from the *floating arm,* an exclusive patented Dazor development.

An investment in Dazor *Floating* Lamps will come back to you many times in higher worker efficiency and morale, in the quality and quantity of work produced, in the prevention of errors, accidents and waste.

Phone Your Dazor Distributor

. . . get from him the full Dazor story, application assistance and an on-the-job demonstration. Your distributor's name, if unknown to you, can be secured by writing to the Dazor Manufacturing Corp., 4483 Duncan Ave., St. Louis 10, Mo.

IN CANADA address inquiries to Amalgamated Electric Corporation Limited, Toronto 6, Ont.



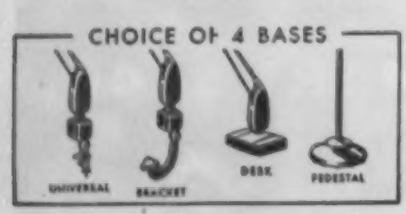
Precision machining is made easier, more certain with precise Dazor lighting.



Controlled Dazor lighting helps this dispatcher control train movements.



Intense Dazor illumination is here directed exactly where welder needs it.



DAZOR *Floating* LAMPS

FLUORESCENT *and* INCANDESCENT



A manufacturer's dream that pays off in cash!

NEVER BEFORE have there been so many new materials so richly available for a manufacturer's profit.

Consider *RESPROID*—a manufacturer's dream if there ever was one . . . a product with truly infinite possibilities. It includes plastic coatings and unsupported films for shower curtains, luggage, upholstery, hospital sheeting, automobiles, food covers and many other items. Extruded plastics for hundreds of uses.

RESPROID is waterproof, resistant to most acids, alkalies and salts, insoluble in most greases and oils. Transparent or opaque, it comes in jewel-like colors and pastel shades—in paper-thin calendered films printed or plain—or in heavy films embossed with leather grains. It is easy to handle and may be stitched or heat-welded.

Turn *RESPROID's* possibilities into business for you.

The only limit to the ways *RESPROID* can serve you is your own imagination.

Respro INC.

CRANSTON 10, RHODE ISLAND

Genuine Resproid Plastic



"Brother... you're too swell-looking for this tough job!"

The foreman could be wrong. It doesn't follow that whatever is handsome *won't* stand up. Think of KYS-ITE—how it combines good looks with durability, lightness with strength. Such properties, as well as those below, put engineers in a "KYS-ITE for me" frame of mind. Why not read on—you may find *your* answer there.

GREAT STRENGTH WITH LIGHT WEIGHT—Preformed before curing, an even distribution of phenolic resin on interlocking fibres results in great tensile and compressive strength and with an impact strength up to 5 times that of ordinary plastics.

WIDE RANGE OF SHAPES—Complicated pieces with projections and depressions, large or small shapes and sections—all these and more, too, are molded successfully in KYS-ITE.

KYS-ITE CAN "TAKE IT"—Unusually durable, resists abrasion, impervious to mild alkali and acid solutions.

INTEGRAL COLOR—KYS-ITE's lustrous finish is highly durable; the color is an integral part of the material itself. A wipe and it's bright!

NON-CONDUCTOR—KYS-ITE's dielectric properties make it invaluable where safety is a factor. Non-conductor of heat. Non-resonant, non-reverberating.

WE MOLD TO SPECIFICATIONS . . . articles reach you in completed form. Production now being scheduled as orders arrive. Your inquiries are invited—no obligation for our services. Why not get in touch with us soon?

KEYES FIBRE COMPANY
420 Lexington Avenue
New York 17, New York
Plant at Waterville, Maine

KEYES
MOLDED PRODUCTS

KYS-ITE articles indicating the range of items we mold to specifications and deliver complete, ready for use.



KYS-ITE

Preformed Plastic Combining Long-Fibered Wood Pulp and Synthetic Resin

®Trademark Reg. U. S. Pat. Off.

"BIG PRESS"

ELMES QUALITY SAVES MONEY on SMALL-PRESS JOBS

● Dependable hydraulic pressure! You can have it at *surprisingly* low cost in Elmes Laboratory and Small-Production Presses. Molding. Checking new dies. Experimenting before starting quantity runs. Sampling. Research work. Volume production. *Whatever* the need, these economical, well-built presses cut costs, save money. Even an inexperienced operator can be sure of speedy, *accurate* results with an Elmes.

Small Elmes presses are as easy to *buy* as they are to use. Just select the capacity and platen size you want, and specify either full manual operation or Elmes *effortless* quick-closing. Each press is complete and self-contained. Pump and reservoir are integral parts. *Honed* cylinder. *Regrindable* valves. Head adjustable to suit work. Distributors in principal industrial centers. Get *all* the facts today on these versatile, small presses.

TWO TYPES: Full-Manual, and Power Quick-Closing

Free Bulletin No. 1035B gives complete information on 20-, 30-, and 50-ton models. It's yours for the asking.

20-ton, 2-column Laboratory Press. Full manual operation. Overall dimensions: 17" x 15" x 41" high. Width between columns: 12". Opening: 0" to 16". Platen: 8" x 8". Ram: 3" diam., 6" stroke. Shipping weight: 425 lbs. Furnished with electric or steam hot plates, and other accessories as needed. Price, Chicago, without accessories: $275.00.

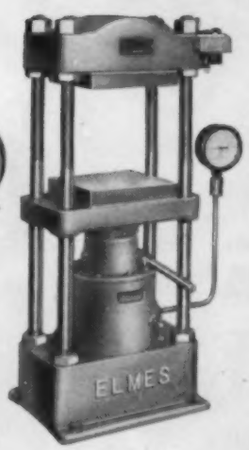
ELMES

Since 1851

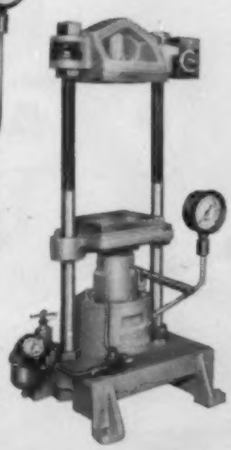
HYDRAULIC EQUIPMENT

30-ton Small-Production Press with fast, effortless "touch-of-a-button" quick-closing. Shop air raises platen instantly. 16¾" x 13½" x 41" high. Opening to 12". Platen: 12" x 10". Ram: 4" diam., 6" stroke. Weight: 660 lbs. Furnished with electric or steam hot plates, and other accessories as needed. Price, Chicago, without accessories: $462.00.

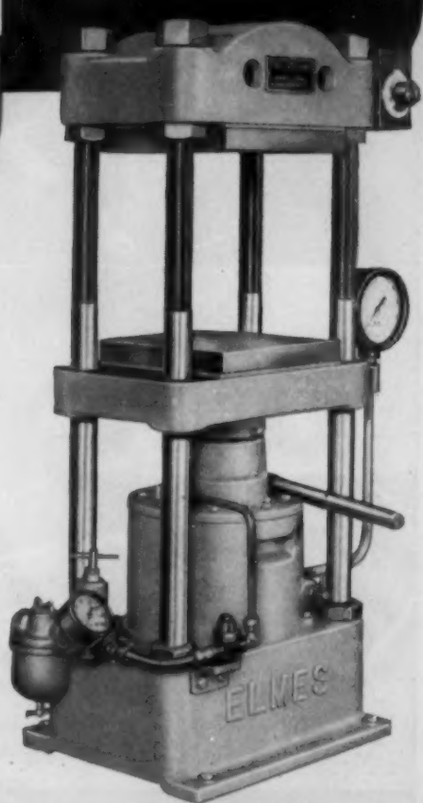




30-ton Laboratory Press with corner-guided platen. Price, Chicago, without accessories: $412.00.



20-ton Small-Production Press with "touch-of-a-button" closing. Price, Chicago, less accessories: $325.00.



ELMES ENGINEERING WORKS *of* AMERICAN STEEL FOUNDRIES, 225 N. Morgan St., Chicago 7, Ill.

METAL-WORKING PRESSES · PLASTIC-MOLDING PRESSES · EXTRUSION PRESSES · PUMPS · ACCUMULATORS · VALVES · ACCESSORIES

FOR DRY OR COOLANT GRINDING

*SPEED-WET** BOOSTS PRODUCTION with "RESIN-BONDING"



Resin-bond production is premium production—improved speed, stamina and finish at lower cost. Why? Because each individual abrasive grain in Speed-wet resin-bonded products is twice anchored in a heat-set resin adhesive, which, once hardened, can never remelt or flow or release its grip.

When used dry, Speed-wet resin-bonded abrasives are immune to cutting heats and humidity. Used wet, they are impervious to water, cutting oils or coolants.

Thus, for dry or coolant grinding, or for polishing and finishing of metals or glass or plastics, Speed-wet resin-bond abrasives deliver extra performance. Specify Speed-wet Metalite for aluminum oxide grit—or Speed-wet Durite for silicon carbide. Metalite or Durite, they're both resin-bonded if they are marked Speed-wet*.

*Reg. U. S. Patent Off.



BEHR-MANNING (DIVISION OF NORTON COMPANY) **TROY, N. Y.**



Comet Camera, molded for Zenith Camera Corp., Chicago, Ill.





CLEAR PICTURE OF

Skillful Molding

FOCUS your attention upon this Comet camera. It will clearly illustrate the type of workmanship you can expect when we mold your product. If your job calls for precision tolerances, you will get them. The Comet did. As the first low priced camera with a focusing apparatus, it demanded exacting workmanship in construction. If your product demands durability, our engineers will see that it receives it through selection and careful molding of the correct plastic material. If your product demands style, it will have it. Increased eye appeal is included in the blueprints of all products we mold. Increased sales appeal naturally follows. Our engineers will be happy to give you a clear picture of skillful molding in your own product. Consult us today.



Write on your letterhead for the new Injection Molded and Extruded Plastics catalogue. Or, for detailed information about CHILO-PLASTIC* pipe, tubing and fittings, write for circulars containing data and illustrations.

*Trademark Reg.

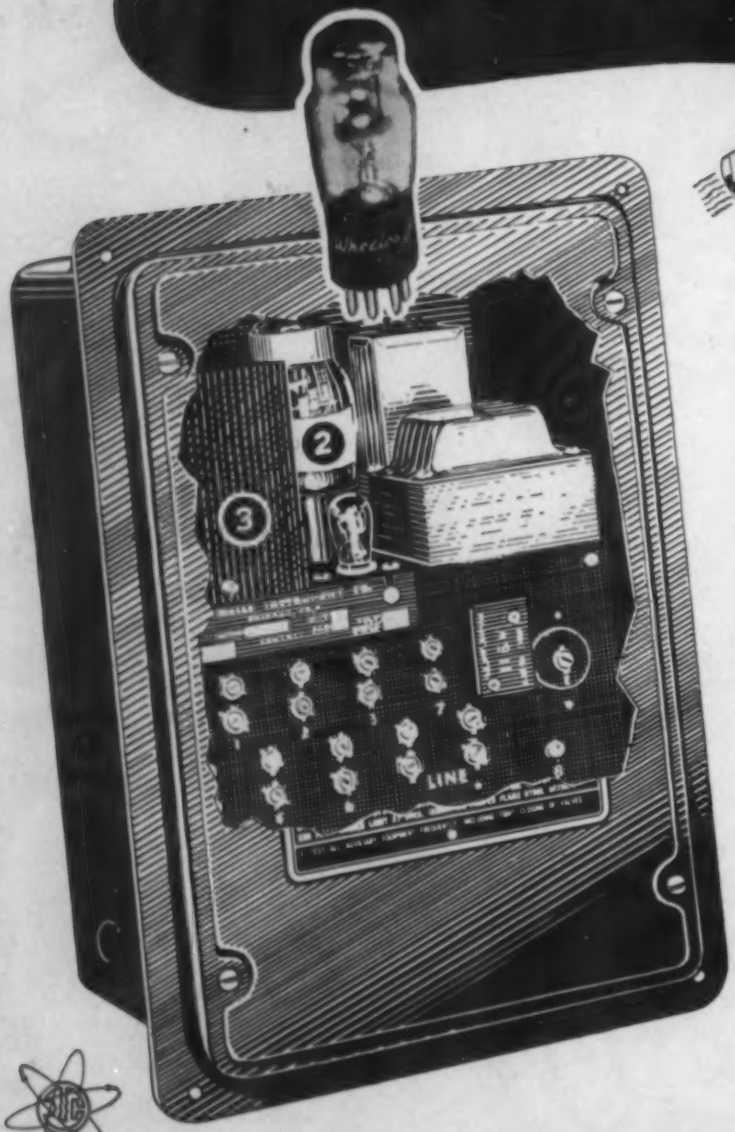
ELMER E. MILLS CORPORATION

Molders of Tenite, Lumarith, Plastacele, Fibestos, Lucite, Plexiglas, Nylon, Polystyrene, Styron, Lustron, Loalin, Vinylite, Geon, Plexene, Polyethylene, Cerex, Fortical, CHILO-PLASTIC*, Saran, and other Thermoplastic Materials

153 WEST HURON STREET • CHICAGO 10, ILLINOIS

Buy Wheelco

Flame-otrol Combustion Safeguard





1. Operating on the principle of electrical conductivity of flame, the sensing element is an ELECTRODE for gas application. A FLAME-EYE (photo-electric cell) is used for oil. With flame failure, the resistance of the sensing circuit increases.

2. The increase in resistance due to flame failure is translated by the VACUUM TUBE into a large change of current, sufficient to operate the relay.

3. The RELAY operates to close the fuel valves. In addition to cutting the fuel off on flame failure, the Flame-otrol also actuates the relay to safe position in case of inadequate maintenance.

The trend is to Wheelco Flame-otrol Combustion Safeguards for protection of all fuel-fired furnaces, boilers, ovens, kilns, etc. Listed and approved by ASSOCIATED FACTORY MUTUAL LABS. and UNDERWRITERS' LABORATORIES.

WHEELCO INSTRUMENTS COMPANY

875 W. Harrison St., Chicago 7, Ill.

473

WHEELCO *Electronic* CONTROLS

Speed · Simplicity · Serviceability



In the past, Monsanto has often been forced to offer you regretful apologies instead of the Lustron you wanted. But now, in spite of continuing shortages in other materials, *you can go ahead with your production plans* with certainty . . . with Lustron.

Monsanto will manufacture approximately 80 million pounds of Lustron polystyrene molding compound during 1947. That means you will be able to get all you need of this most versatile of all plastics.

And you can be sure that when you get Lustron, *you'll really be getting something*. Availability is only one of the compelling reasons* for making your brightest product plans with Lustron.

So plan to move ahead with full speed and certainty in '47. Specify Lustron in your product plans. You'll be safely out in front! Write for complete Lustron data . . . technical information, information on supplies: MONSANTO CHEMICAL COMPANY, Plastics Division, Springfield 2, Mass. In Canada, Monsanto Ltd., Montreal, Toronto, Vancouver. See Monsanto at the National Plastics Exhibition, May 6 through 10, Chicago, Ill. Lustron, Reg. U. S. Pat. Off

***8 More reasons for specifying Lustron:**

- Rainbow range of colors, clear or opaque
- High dimensional stability
- Light weight
- Low price
- Excellent electrical properties
- Excellent resistance to moisture, acids, alkalies
- Finest molding qualities
- Freedom from taste and odor

MONSANTO
CHEMICALS ... PLASTICS
SERVING INDUSTRY WHICH SERVES MANKIND

FOR MOLDING PLASTICS...



DISSTON
MOLD STEELS

Manufactured to meet your individual needs

Whatever your plastics mold requirements, you are certain to find among these three specialized Disston Mold Steels one that will meet your needs exactly.

FOR DIFFICULT SHAPES AND SHORT RUNS

PLASTIRON . . . a low carbon steel that is easy to work, withstands extreme hobbing, and is exceptionally well suited for intricate forms.

FOR GENERAL SERVICE AND MEDIUM RUNS

PLASTALLOY . . . a low carbon steel having the right amount of chrome and nickel to assure great core strength and long wear, yet permit easy hobbing.

FOR HARD SERVICE AND LONG RUNS

PLASTIKUT . . . a "cut mold" steel for maximum core and case strength. Must be machined instead of hobbed, but because it stands up extra long in service, PLASTIKUT is very economical.

ALL PROVIDE THESE ESSENTIALS

Each of these Disston Mold Steels is composed of carefully selected raw materials and produced in Disston electric furnaces. Modern steel practice keeps every process under rigid control. Each is melted and hot-worked with great care . . . is carefully inspected to assure freedom from porosity and inclusions . . . is uniformly sound, carburizes evenly, and produces unusually smooth cavities.

● If you have a special mold or hob problem, let Disston engineers and metallurgists help you solve it. You may consult them freely, without charge or obligation . . . and in confidence.

Write for Folder Contains much useful information which may help you get best results in your use of mold and hob steels.

STEEL . . . Everybody who wants to obtain steel can help himself to get it by immediately starting scrap into the channels that serve steel mills.

HENRY DISSTON & SONS, INC., 334 Tacony, Philadelphia 35, Pa., U. S. A.

DISTRIBUTORS

NEW ENGLAND
Achorn Steel Company
381 Congress Street
Boston 10, Mass.

METROPOLITAN NEW YORK AND NORTHERN NEW JERSEY
Bright Steel Corporation Offices & Warehouses, 528-540 West 22nd Street, New York 11, N. Y. and 224-236 Culver Avenue, Jersey City 5, N. J.

Let PLYON Do It

If you're looking for a laminate material that's both practical and decorative...if you're looking for a material that can really take it and still look beautiful. then Plyon is for you!

When you first see Plyon you'll be impressed with its appearance. It's so sleek and colorful. You'll discover, too, that Plyon is waterproof, and resistant to most acids, solvents and alkalis. What's more, Plyon comes in a variety of colors and patterns; is limited only by the base material used. Plyon is a laminate—the result of a process of impregnation where the base material is thoroughly saturated. It can be made rigid or flexible, depending on the application. And Plyon is available now!

The applications of Plyon increase from day to day. Plyon for splash surfaces such as table tops and table mats...Plyon for curved surfaces on counter fronts and bar fronts...Plyon for kick plates and side panels in trucks, buses and taxis...for scuff panels and surfaces that get hard wear in planes and trains ...Plyon for baggage compartments...Plyon for lampshades, for outdoor furniture...Plyon for luggage ...If you have a particular application for Plyon, we'd like to talk it over with you. There's every chance Plyon can do it!

Swedlow PLASTICS CO.

5531 District Boulevard • Los Angeles, Calif.

★ NATIONAL PLASTICS Exposition ★

To those who recall the impressiveness of SPI's first National Plastics Exposition last April, announcement of the Chicago show is headline news. In holding this exposition in Chicago the industry will present to the midwest and the nation, truly representative showing of all the new materials, machines, equipment, processes in the growing field of plastics.

It will be an *industry* show. To assure unhampered contact between exhibitors and visitors, the general public will be excluded. To all directly in the plastics industry, as well as to engineers, industrial purchasers, store buyers, designers, stylists, production managers and others whose products and functions may be enhanced by a better knowledge of plastics, SPI extends a most cordial invitation to visit the exposition. If you would like to attend the exposition, write the Society of the Plastics Industry, 295 Madison Ave., New York 17.

★

Concurrently **SPI** *is holding a national conference of its membership at The Hotel Stevens.*

For vital information about plastics, plan now to visit SPI's great Second National Plastics Exposition!

2ND NATIONAL PLASTICS EXPOSITION

SPONSORED BY THE SOCIETY OF THE PLASTICS INDUSTRY

★ THE COLISEUM • CHICAGO
MAY 6 • 10 - 1947

YES!

VINYL sheeting

can be successfully bonded to

VINYL sheeting

Address: 270 Madison Ave., New York 16; 3641 So. Washtenaw Ave., Chicago 32; 735 Battery St., San Francisco 11; and other principal cities. In Canada: Meredith, Simmons & Co., Ltd., Toronto. In England: National Adhesives, Ltd., Slough.

National ADHESIVES

EVERY TYPE OF ADHESIVE FOR EVERY INDUSTRIAL USE

To manufacturers of

TABLE TOPS

and similar items

X

Riegel-X-11 . . . for core materials . . . has been approved and is now being used by leading manufacturers of table tops. It is available in resin contents adaptable to either high or low pressures.

Write for our special bulletin on Riegel-X Core Stock, stating your laminating pressure per square inch.

Riegel Paper Corporation, 342 Madison Avenue, New York 17, N. Y.

X

RIEGEL-X

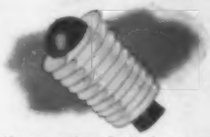
A group of impregnated papers for surfacing, for molding and for high or low pressure laminates.



MECHANICAL strength can be added to molded parts without burdensome weight. Fastening inserts, or structural reinforcements, are light, strong, available in many cases from stock.



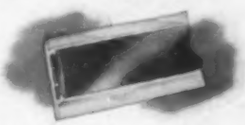
ELECTRICAL conductivity of aluminum is high. Perhaps you're thinking about a molded plastic electrical part where aluminum inserts provide the necessary conductivity. They're strong, too!



THERMAL properties of aluminum are excellent. Let's say you're designing a plastic product which must be air-cooled. You might use aluminum discs, molded in, as above.



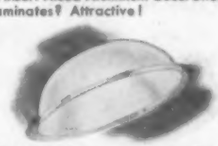
DECORATIVE values of aluminum are a long story in themselves. Use it plain, or with frosty or mirrorlike Alumilite (patented process) or colored finish. Remember, it's light!



EXTRUSIONS of plastic combined with extrusions of aluminum? Why not? One supplements the other, in beauty and strength. Alcoa Aluminum is available in many stock shapes.



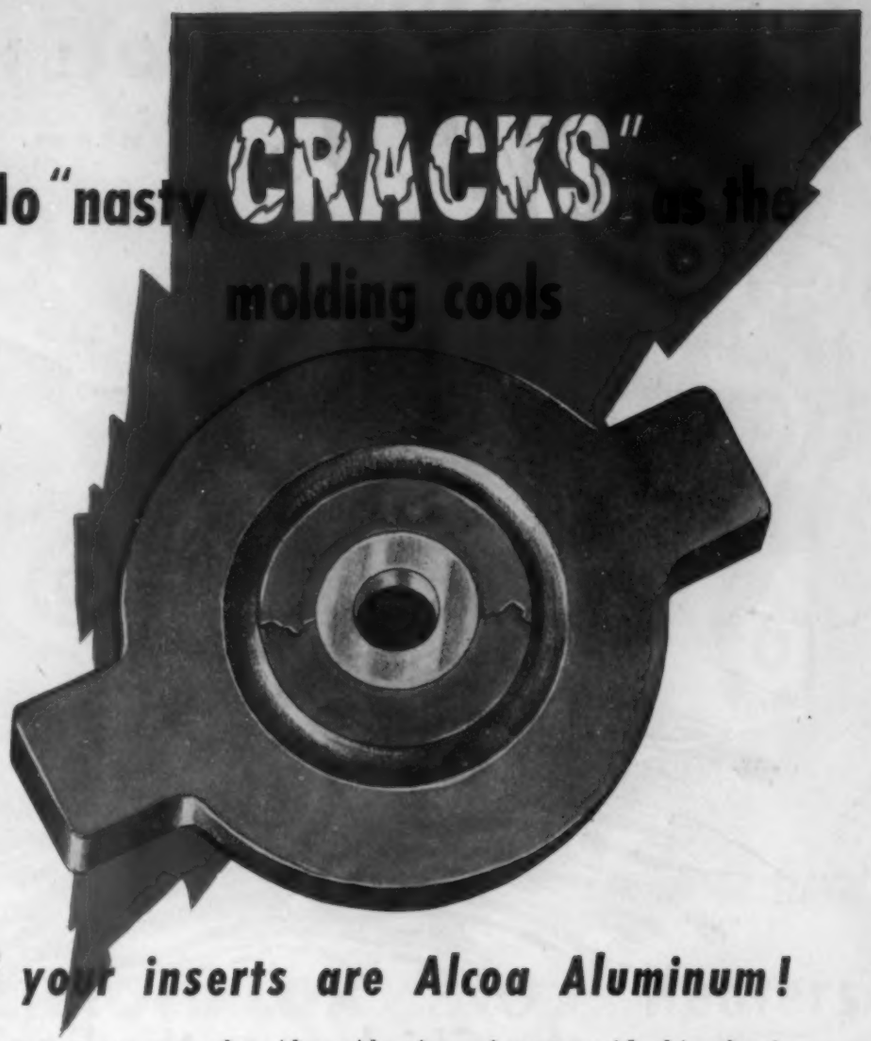
LAMINATED plastics can be faced with aluminum sheet for a new idea in modern materials. Or, why not insert Alcoa Aluminum decorations in your dark laminates? Attractive!



FORMED plastic sheets team up well with Alcoa Aluminum, as in this navigator's dome. The whole assembly is light, strong, easy to mount. Is there a household idea here?



CHEMICAL properties of aluminum supplement those you like to stress in plastics. Can it help you in products for textile, process, petroleum, pharmaceutical, food industries?



If your inserts are Alcoa Aluminum!

No secret process makes Alcoa Aluminum inserts so ideal in plastic molding materials. Simply nature, equipping aluminum alloys with a coefficient of expansion so near that of common plastics that the insert shrinks *too*, as it cools. The stresses that cause cracking are eliminated.

This property of Alcoa Aluminum alone elects it for many a difficult insert job. Don't forget the others—it's *lighter* in weight, *lower* in cost, and far more *corrosion-resistant* than ordinary insert metals. No wonder we call it "Plastics' Best Friend In Metals"! Use it, wherever metal is required in the plastic art. ALUMINUM COMPANY OF AMERICA, 2175 Gulf Building, Pittsburgh 19, Pennsylvania. Sales offices in principal cities.



ALUMINUM-PLASTIC TEAMWORK PAYS OFF!

ALCOA FIRST IN **ALUMINUM**

ALCOA ALUMINUM

IN EVERY COMMERCIAL FORM

Which?



. . . the Chicken or the Egg?

We'd prefer to "pass" on this question—but when it comes to plastic scrap, there are no questions or problems for which we can't provide a quick, intelligent answer based on experience, skill and efficiency.

WE BUY, SELL AND RE-WORK PLASTICS SCRAP

Plastics Division:

H. MUEHLSTEIN & CO. INC.

122 EAST 42nd STREET, NEW YORK 17, N. Y.

BRANCH OFFICES: Akron • Chicago • Boston • Los Angeles • Memphis

WAREHOUSES: Jersey City • Akron • Boston • Los Angeles • Memphis

CHROMALOX ELECTRIC HEATERS

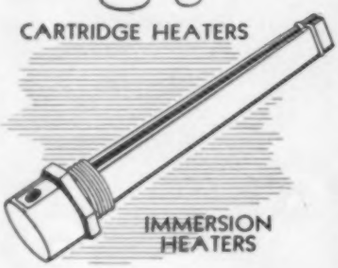
Standard types in popular sizes are available for immediate delivery.



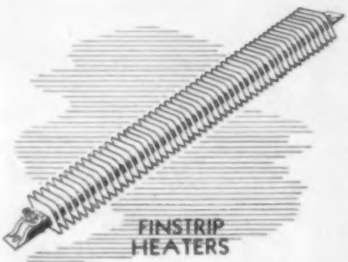
STRIP HEATERS



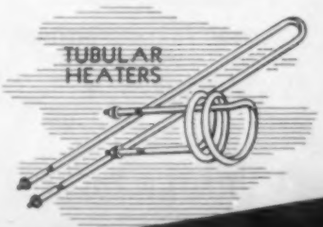
CARTRIDGE HEATERS



IMMERSION HEATERS



FINSTRIP HEATERS



TUBULAR HEATERS

HEAT—Made to Order

WHEN AND WHERE YOU WANT IT!



Illustrated is a tank heated with Chromalox ELECTRIC Strip Heaters.

with CHROMALOX *Electric* Heaters

• FAST—CHROMALOX *Electric* Heaters give you instant heat in the exact spots where it is needed without unnecessary heat-losses. They quickly build up to desired working temperatures.

• UNIFORM—Close operating temperatures, accurately maintained through thermostatic or manual controls, assure you uniform products.

• DEPENDABLE—Performance proved CHROMALOX Units provide efficient day-in-and-day-out service at low initial-cost, low operating-costs and minimum maintenance-attention.

If you are a user of industrial heat, you will find that you too can save time, money and labor by using CHROMALOX *Electric* Heaters in your plant or product. CHROMALOX Heaters provide economical, efficient and reliable service in thousands of applications ranging from heating liquids, gases and viscous fluids to heating molds, platens, tanks and moving parts.

ENGINEERING SERVICE—A nation-wide organization is available for "on the job" assistance at no cost to you. The Chromalox Engineer nearest you will be glad to show you how efficient and economical electric heat can be used in your plant or product.

CHROMALOX
Electric HEAT FOR MODERN INDUSTRY

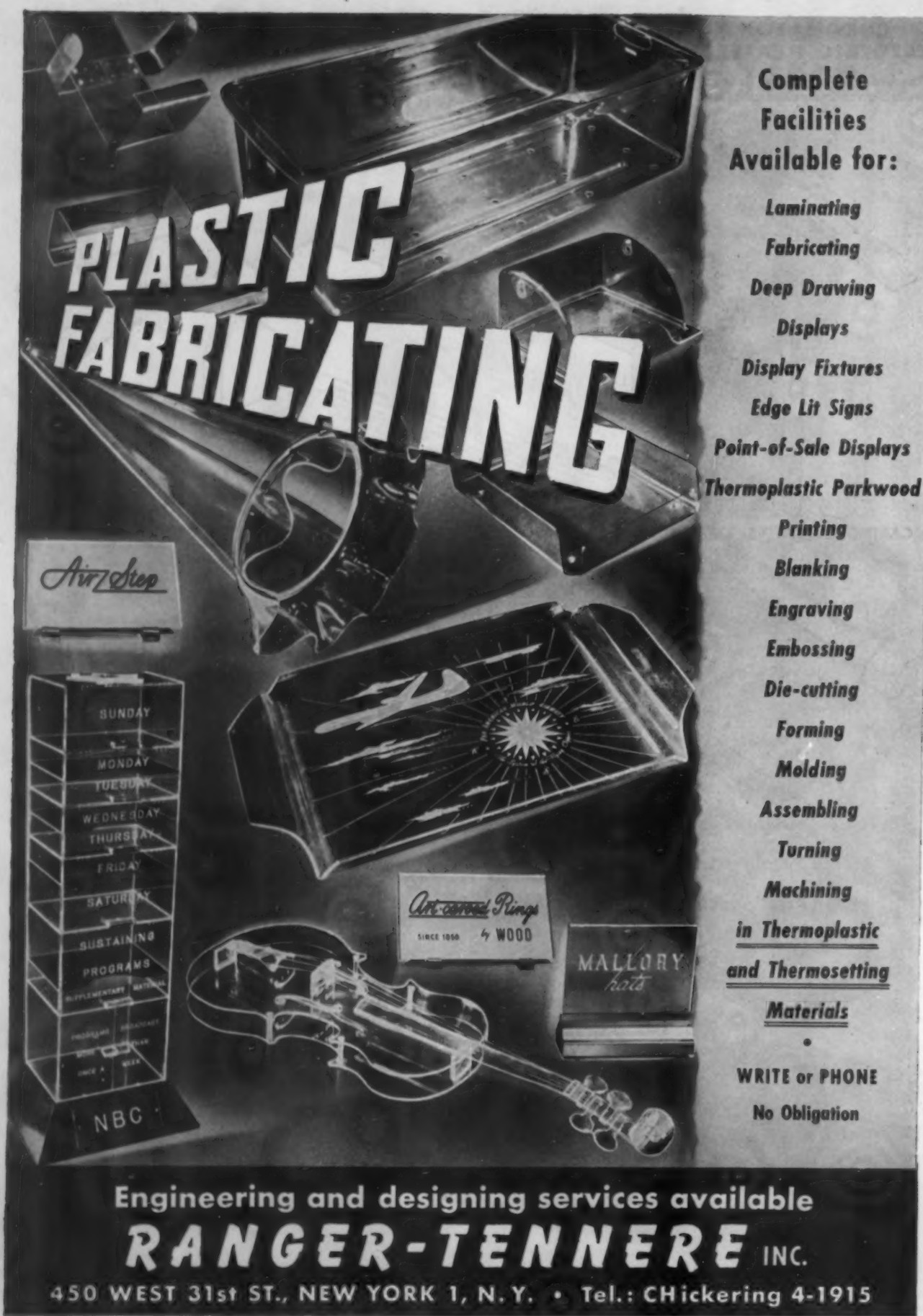
EDWIN L. WIEGAND COMPANY
7503 THOMAS BLVD. • PITTSBURGH 8, PA.

WANT HELPFUL IDEAS?

The booklet "100 Ways to Apply Electric Heat" and Chromalox Catalog 42 contain a wealth of informative data on the use of electric heat in industry. Send for your copies today.



IC-28



Complete Facilities Available for:

Laminating
Fabricating
Deep Drawing
Displays
Display Fixtures
Edge Lit Signs
Point-of-Sale Displays
Thermoplastic Parkwood
Printing
Blanking
Engraving
Embossing
Die-cutting
Forming
Molding
Assembling
Turning
Machining
in Thermoplastic and Thermosetting Materials

•

WRITE or PHONE
No Obligation

Engineering and designing services available

RANGER-TENNERE INC.

450 WEST 31st ST., NEW YORK 1, N. Y. • Tel.: CHickering 4-1915

An Ideal Injection Molding Machine

for the Mass Production of Plastics Hardware, Toys, Novelties, Jewelry, Automotive Body Appointments

HY-MAC



MODEL IM-2

A NEW *2-ounce* MACHINE by HY-MAC

a Harris Broad design

The newly announced Hy-Mac 2-ounce Injection Molding Machine embodies advanced features of controllability, ease of operation, and production efficiency, which make it ideal for multiple production of small units by inexperienced operators. New type electronic control provides accurate temperature regulation; eliminates danger of burning material. Although rated at 2 ounces, the machine is built with 50% overload capacity. Now in production; order at once for prompt delivery.

See this machine in operation at our plant, or send for complete description.

HYDRAULIC MACHINERY, Inc.
12825 FORD ROAD
Dearborn, Michigan

HYDRAULIC MACHINERY • WESTERN DIVISION • GLENDALE, CALIFORNIA



ALLIED PRODUCTS

Allied

WITH MASS PRODUCTION

COLD FORGED PARTS

High volume production at low cost . . . tolerances as close as are required for most machined parts . . . strength and durability . . . "on time" delivery . . . are guaranteed by Allied's experience in producing cold forged parts. Quotations figured from your part prints will be submitted promptly.

ALLIED PRODUCTS
CORPORATION
DEPARTMENT 32
4622 LAWTON AVENUE DETROIT 8, MICHIGAN

SPECIAL COLD FORGED PARTS • STANDARD CAP SCREWS • HARDENED AND PRECISION GROUND PARTS
SHEET METAL DIES FROM THE LARGEST TO THE SMALLEST • JIGS • FIXTURES • STEAM-HEATED PLASTIC MOLDS
SPECIAL PRODUCTION TOOLS • R-B INTERCHANGEABLE PUNCHES AND DIES • DIE MAKERS' SUPPLIES

definitely

TO COMPETE IN PLASTICS

you need the Thermatron

today!



Oven (left) and press (right) mounted on new 2½ kilowatt Thermatron.

DO YOU KNOW—

How can you get air-tight, water-tight seams—stronger than the thermoplastic material itself—in raincoats, shower curtains, beach toys, food protectors, shoes, handbags . . . in hundreds of other fabricated plastic products?

How can you eliminate stitching, resistance heating, or the use of adhesives and solvents . . . and still get a product with *increased* tensile strength? In plastic molding, how can you decrease curing cycle by 50 to 75%?

How can you bond dissimilar materials most successfully—zippers to vinyl film, for instance?

How can you accomplish *all* these objectives at reasonable cost . . . and without highly trained, highly paid operators?

The answers to these and many other questions are found in our new 8-page booklet *"Electronic Heating & Sealing with the THERMATRON"*

This new attractively illustrated bulletin describes THERMATRON units in detail and gives examples of specific application in preheating, sealing, and bonding. It answers scores of other questions, too, that competition-wise producers of plastic, plywood and rubber products are vitally concerned with today.

THERMATRON heating and sealing units have already made hundreds of profitable, fast-selling new products possible for plastics manufacturers. Every THERMATRON unit is guaranteed and serviced. Find out what the THERMATRON CAN DO FOR YOU. Write today for your copy of "Electronic Heating & Sealing with the THERMATRON".

SEND YOUR MATERIALS FOR TEST WITHOUT CHARGE

Send us samples of the materials *you* use. We will test-seal them on THERMATRON and return samples promptly with full report. No obligation.

Thermatron DIVISION

RADIO RECEPTOR COMPANY, INC.

Since 1922 in Radio and Electronics

251 West 19th Street New York 11, N.Y.

Midwest Sales: Zephyr Electronics, Chicago, Ill.

1858

Six Steps to Better Plastics that helped K-K customers *first!*



PRE-FORMS
Compressing plastic materials into "pills" cut loading time and paved the way for pre-heating.



PRE-HEATING
Heating "pills" *before* molding them not only cut molding time, but improved quality.



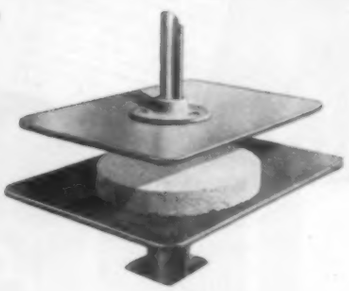
SEMI-AUTOMATIC PRESSES
Knock-out pins for automatic piece ejection further shortened molding operations.



COMPLETE MOLD SHOP
A hobbing press is needed to *complete* tool-room equipment. This gave us control over all mold production.



NEW MATERIALS
Struck with foreign results in molding ureas, we first molded them commercially here.



HEATRONICS
Often heatronic pre-heating further improves results and cuts molding time. K-K pioneered it in plastics.

Please note that "first." These ideas are all standard molding practises today, because they cut production time, improved quality or made new applications possible. But when we worked them out, our customers reaped the benefits first, of course. They liked it fine.

We think a record like this speaks well for more to come. So why not talk plastics with us? We have the facilities—the experience—the plus-value of accomplishment. All information is contained in "A Businessman's Guide to the Molding of Plastics." May we send you a copy—free?



Kurz-Kasch

For Over 30 Years
Planners and Molders in Plastics

Kurz-Kasch, Inc., 1415 S. Broadway, Dayton 1, Ohio. *Export Offices:* 89 Broad Street, New York, N. Y.
Branch Sales Offices: New York • Chicago • Detroit • Los Angeles • Dallas • St. Louis • Toronto, Canada.

FAST RESPONSE TO RADIANT HEAT*



The detection of radiant heat is a vital factor in many thermal control systems. The Fenwal THERMOSWITCH Control presents a large area sensitive to radiant heat energy . . . its temperature sensitive outer shell responds rapidly to changes in radiant heat. The THERMOSWITCH Control is the ideal temperature detecting unit for such applications as the control of temperatures in ovens, incubators, driers, . . . in fact, wherever radiant heat is a factor in the process. In many instances the overall efficiency of a product or process may be increased by utilizing this high radiant heat sensitivity of the Fenwal THERMOSWITCH Control and controlling temperatures without physical contact between the thermostat and functional parts.

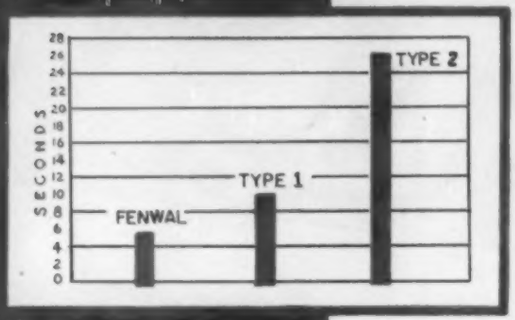


Chart shows the time required for the Fenwal THERMOSWITCH Control and two other thermostats to break contact following sudden exposure to a source of radiant heat, when adjusted approximately 10° F. above the ambient temperature. Note the fast response of the Fenwal unit.

High radiant heat sensitivity is but one of the outstanding features of the Fenwal THERMOSWITCH Control. For more information about the many facts in Fenwal's favor, send for a copy of our Thermotechnics brochure.





#12 of the "Fourteen Facts in Fenwal's Favor".

Fenwal

FENWAL INCORPORATED

35 PLEASANT STREET

ASHLAND MASSACHUSETTS

Thermotechnics for Complete Temperature Regulation

HOW A BANBURY CHANGES MIXING FROM GUESSWORK TO CLOCKWORK

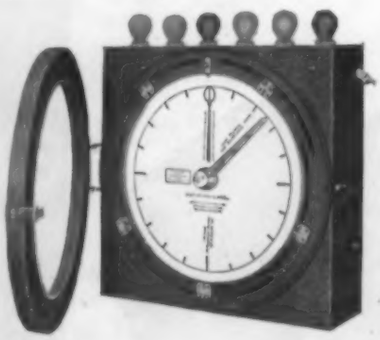


With a Banbury Mixer you can automatically produce batch after batch of uniformly mixed stock with clocklike consistency by following a simple, prearranged routine.

Once the proper sequence and timing of mixing operations for your particular plastic has been determined, the Banbury itself tells your operator what to do and when to do it. The result is standardized, uniform quality and higher production at lower cost.

HERE'S HOW ALL THIS COMES ABOUT—

THE TIMING DEVICE—A telechron-motor-operated timing instrument is mounted in full view of the operator. On the removable paper dials detailed information can be written, giving the operator complete mixing instructions for each stock. Graduated by minutes, the dial tells how long to allow for each operation, when to add ingredients and when to discharge the batch. The device automatically signals the operator as each stage of the operating cycle is completed by flashing one of a series of lamps on the instrument.



TEMPERATURE CONTROL—The sides, rotors and discharge door of the Banbury are cored for circulation of cooling water or steam. Valves for regulating the various circuits are arranged to put accurate control of batch temperature at the operator's finger-tips. An electrically actuated potentiometer pyrometer with its thermocouple in direct contact with the batch indicates and records the temperature on a chart, continuously.

Of the eight standard sizes of Banbury mixers, the one most generally used for plastics is the size 3A, illustrated above, having a capacity of 100 x specific gravity of the stock. For complete information send for Bulletin No. 180. FB-350

FARREL-BIRMINGHAM COMPANY, Inc.
ANSONIA, CONN.

Plants: Ansonia, Derby and Stonington, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, Stonington, New York, Pittsburgh, Akron, Chicago, Los Angeles, Tulsa, Houston, Charlotte

Farrel-Birmingham



The Lester "Betsy Ross" Spinet equipped with "Ivoryton" keys made by Pratt, Read & Company

The characteristics of ease of fabrication, dimensional stability, toughness, and beauty which have kept nitrocellulose plastics popular for so many years are now utilized by Pratt, Read & Company in the manufacture of the "Ivoryton" piano key.

Nitrocellulose plastics can be fabricated to cover the top and front of the "Ivoryton" key in one piece. Thus, the lip—the part most susceptible to damage—is eliminated. This advantage is additional to those possessed by all nitrocellullose-plastic, white, piano keys: great resistance to cracking and discoloration, resistance to chemicals, and smooth surfaces that are easily cleaned.

Perhaps this new application of this proved, tough, easily fabricated plastic will suggest a way for *you* to improve an existing product, or to devise a new and better one. Write for technical details.



Nitrocellulose for dimensionally stable eyeglass frames

Nitrocellulose for beautiful, non-corrodible pen and pencil barrels





Nitrocellulose for impact-resistant tool handles

HERCULES

CELLULOSE ACETATE
CELLULOSE NITRATE
ETHYL CELLULOSE

For general-purpose production plastics

Hercules does not make plastics or molding powders, but supplies the high-quality nitrocellulose and other cellulose derivatives from which they are made.

For data, please write *HERCULES POWDER COMPANY* (INCORPORATED) 916 Market Street, Wilmington 99, Delaware

CP7-3



This booklet belongs on the desk of every designer, engineer, production chief and purchasing agent in plastics. Send for it.

PLASTICS THAT **GLOW** IN THE DARK . . . MEAN SALES THAT GROW IN THE DAY!

VIOLITE*

LUMINESCENT PHOSPHORESCENT FLUORESCENT PIGMENTS

Plastic products that *glow in the dark* have tremendous sales appeal. This has been proved time and again with dials, knobs, signs, markers, wall-plates, tools, radios, toys, novelties, etc. There may be many items you are now manufacturing, or planning to manufacture, that will benefit by this simple improvement. And it *is* simple! Merely specify the addition of VIOLITE Phosphorescent or Fluorescent Pigments when ordering your plastic molding powders. If you are not completely familiar with the many possibilities offered by VIOLITE send for this free booklet today.

WHEN ORDERING MOLDING POWDER

SPECIFY *VIOLITE*...

You need no extra equipment... your unit production cost is not appreciably increased... you need not alter your production methods... our technical experts will gladly advise you how VIOLITE can be used in your own products.

Sun CHEMICAL CORPORATION

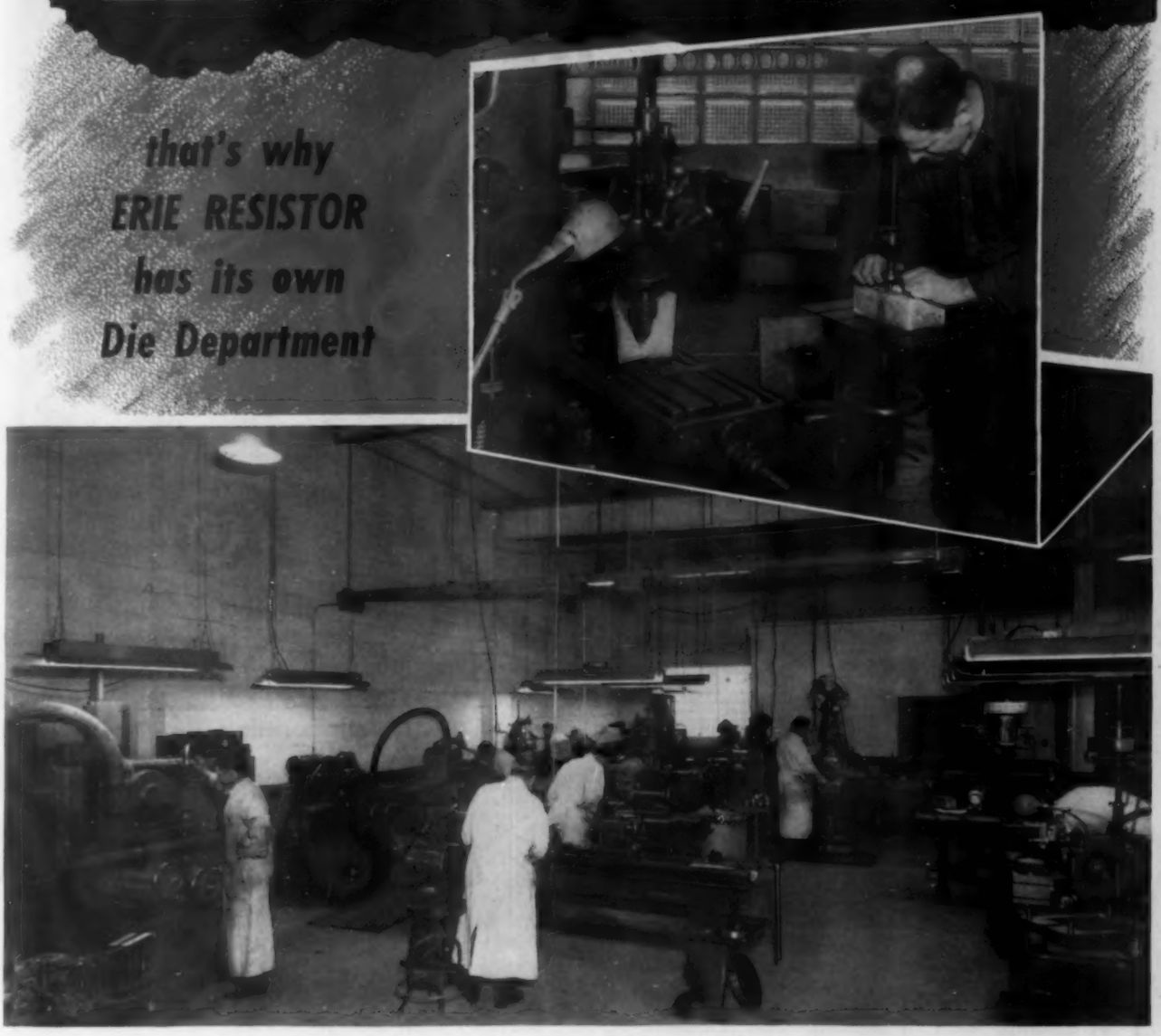
VIOLITE
LUMINESCENT PIGMENTS
PHOSPHORESCENT • FLUORESCENT

RHODE ISLAND LABORATORIES, INC.
AN AFFILIATE OF SUN CHEMICAL CORP.
100 PULASKI STREET, WEST WARWICK, R. I.

Reg. U. S. Pat. Off.

Better Dies Mean Better Molded Parts

that's why ERIE RESISTOR has its own Die Department



A correctly designed and constructed die is one of the most important factors in producing outstanding custom molded plastic parts.

At Erie Resistor, all new dies are laid out and designed by our own engineering department. We have our own die shop, staffed to a large extent by the same tool makers who have serviced plastic dies at Erie Resistor since we first pioneered the field of custom injection molded plastics in 1935. These men work under the direction of a superintendent who has had 40 years' experience in die-making, much of which has been spent on plastic molds. As shown in the illustrations, the die shop has all the necessary equipment of latest design for producing molds exactly to print.

With these facilities, you are assured that when you place your order for custom injection molded parts with Erie Resistor, accurate and correctly designed dies will facilitate the production of finished pieces that meet your specifications and your expectations.

Plastics Division

ERIE RESISTOR CORP., ERIE, PA.

LONDON, ENGLAND — TORONTO, CANADA

NEW PM IDEAS IN PLASTICS

This may be the time to consider new ideas for improving your product through the use of molded plastics. Through close collaboration with your organization, our plastics research and design staff can help you to obtain the most practical application of plastics to your product requirements. You benefit from our plastics experience and from the most modern equipment for plastics molding. Send now for Catalog Folder describing our services.

PM
REG. U.S. PAT. OFF.

PLASTIC MANUFACTURERS
INCORPORATED
STAMFORD, CONNECTICUT
INJECTION, TRANSFER & COMPRESSION MOLDING • COMPLETE ASSEMBLY

Representatives: NEW YORK CITY—19 West 34th Street • DETROIT, MICH.—805 New Center Building
CAMBRIDGE, OHIO—633 Upland Road • LOS ANGELES, CAL.—1440 S. Robertson Blvd.
CANADA—David C. Orrock & Co., 1405 Bishop St., Montreal



Men working together, for production, can give America what it needs: more and finer products ...greater *values*... better standards of living... for all! Slow-downs or forced idleness deprive everyone of the gains industry can offer only through more production.

Only through cooperation for production can America benefit by the great technological advances of recent years. Modern MOSINEE papers, for instance, custom-made to meet specific requirements, are helping to improve products, slash costs, raise standards of living.

MOSINEE paper technicians are equipped to create paper with scientifically controlled chemical and physical characteristics to improve many products and processes. Call MOSINEE!

MOSINEE PAPER MILLS COMPANY

MOSINEE • WISCONSIN

Essential Paper Makers

Please address your letter Dept. "A"

UNION PACIFIC

TREASURE MAP OF INDUSTRY

Utah *



Herbert B. Maw, Governor of Utah, tells his state's story.

"Nature was kind to Utah. Deposited within her borders are rich and varied sources of coal and iron, lead and zinc, copper, silver and gold. These and many other industrial attributes are part and parcel of the undeveloped sections of this state.

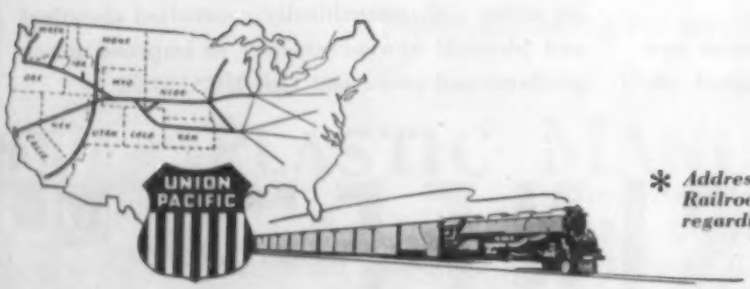
"A gigantic steel industry which can serve the west signals our industrial ambition. It will form the nucleus of a network of associated industries.

"Our need now is people and leadership to share in the prosperity of a western empire. Our natural resources are practically untouched. They assure a long life to an industrial future which is just now beginning. Utah invites new and expanding industry to investigate opportunities here before deciding upon new locations."

★ ★ ★

For industrial resources and opportunities, look to Utah. For unexcelled rail transportation . . .

be Specific –
say "Union Pacific"



* *One of a series of advertisements based on industrial opportunities in the states served by the Union Pacific Railroad.*

* *Address Industrial Department, Union Pacific Railroad, Omaha 2, Nebraska, for information regarding industrial sites.*

UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE

Check Your Requirements - Send for Complete Information

What do You Want

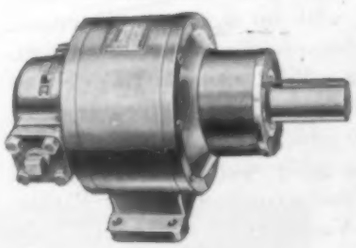
in a Small Constant Delivery Pump?

Check Your Requirements - Send for Complete Information

- ☐ Up to 5000 pounds per square inch pressure for continuous duty service.
- ☐ 3 gallons per minute at 1800 rpm. Or 2 gpm at 1200 rpm.
- ☐ Small size. 6 Inches in diameter—11 inches long—weight 35 pounds.
- ☐ Perfect hydraulic balance. Thousands of hours of trouble-free service.
- ☐ High volumetric efficiency: 95% with the lightest hydraulic oils.
- ☐ Radial multi-plunger design. Smooth delivery.
- ☐ Efficient performance as a powerful reversible hydraulic motor.
- ☐ Quantity production prices.

Only *Superdraulic Junior* Pumps Can Give You All This!





Superdraulic Junior is the ideal pump for the many applications where high pressures must be produced from a unit of minimum size and weight. You undoubtedly have one or more jobs that Superdraulic Junior can do better—and cheaper. Write, wire, or phone.

Superdraulic Corporation

HYDRAULIC PUMPS • MOTORS • TRANSMISSIONS • VALVES

MILLER AT FORD ROAD • DEARBORN, MICHIGAN

HYDRAULIC BALANCE FOR LIFE

HYDRAULIC BALANCE FOR LIFE

HYDRAULIC BALANCE FOR LIFE

HYDRAULIC BALANCE FOR LIFE

HYDRAULIC BALANCE FOR LIFE

HYDRAULIC BALANCE FOR LIFE

HYDRAULIC BALANCE FOR LIFE

HYDRAULIC BALANCE FOR LIFE

HYDRAULIC BALANCE FOR LIFE

COMMON SENSE ASSEMBLY ENGINEERING



In the assembly of this "Camflex" camera, 28 P-K Type "U" Drive Screws were used to fasten the sides to the body (sheet metal to extruded aluminum parts); the shutter to front (sheet metal to plastic) and the levers to operating bar (sheet metal to bar stock). "Gave us the economy, simplicity, strength, and beauty we wanted."

IN PLANNING this inexpensive camera, the manufacturers knew there was no room in the production budget for needless assembly expense. So they wisely questioned fasteners until they found the right one for the job . . . the P-K Type "U" Drive Screw. "It's the logical method of assembly", writes the National Distributor Sales Company, "the only solution to our problem".

Machine screws would require a tapping operation and tap expense: riveting would be awkward, would complicate the design. Both would boost assembly costs. By using P-K Type "U" Drive Screws, fastenings that provide lasting strength are made the simplest way—by pressing the screws into plain untapped holes.

Whether your product is in the planning stage, or in production, it's plain common sense to find out if you can make the savings offered by the P-K "short-cut" method. In many plastic products P-K Screws permit elimination of inserts that slow up molding, with no sacrifice of strength. They often permit improvement in product design.

Why not call in a P-K Assembly Engineer to review your fastening methods. Records show that in 7 out of 10 jobs, P-K Fastenings will save up to 50% in assembly work-hours. Or, mail assembly details for recommendations. Parker-Kalon Corp., 200 Varick St., New York 14, N. Y.

Sold Only Through Accredited P-K Distributors

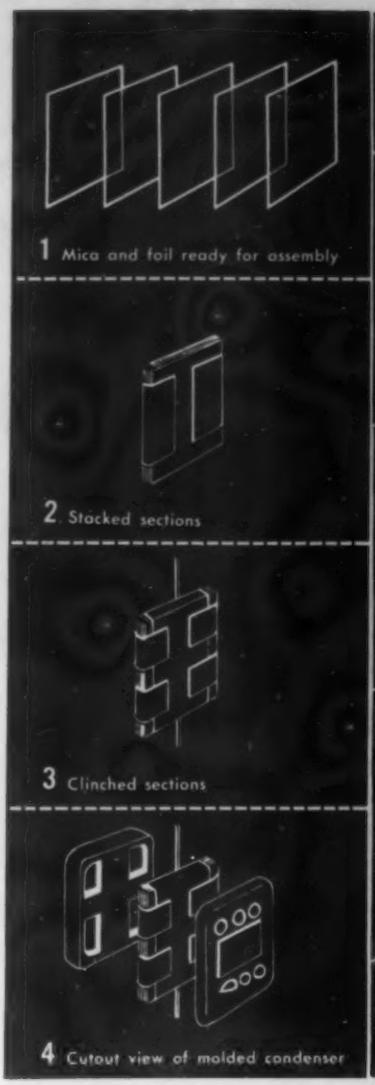


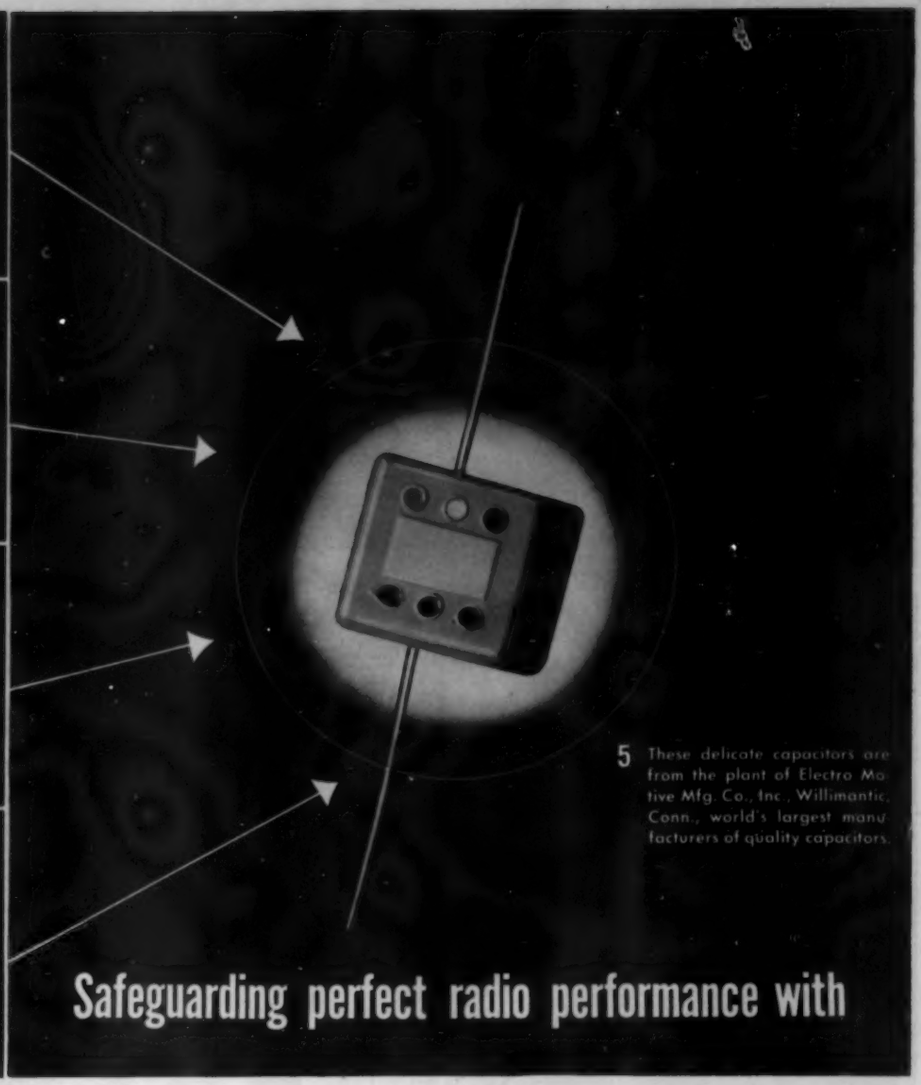
P-K



PARKER-KALON SELF-TAPPING SCREWS

A FASTENING FOR EVERY METAL AND PLASTIC ASSEMBLY





Safeguarding perfect radio performance with

RESINOX 7934

Painstakingly engineered and precisely assembled, the delicate parts of these capacitors are protected . . . volume production facilitated . . . with Resinox 7934.

Developed during the war to provide unfailing insulation for medium and high frequency apparatus under the severest operating conditions, Resinox 7934 is a mica filled compound based on a new phenol formaldehyde resin evolved by Monsanto's plastics research. Available now, Resinox 7934 offers these outstanding advantages to molders of all types of electrical apparatus:

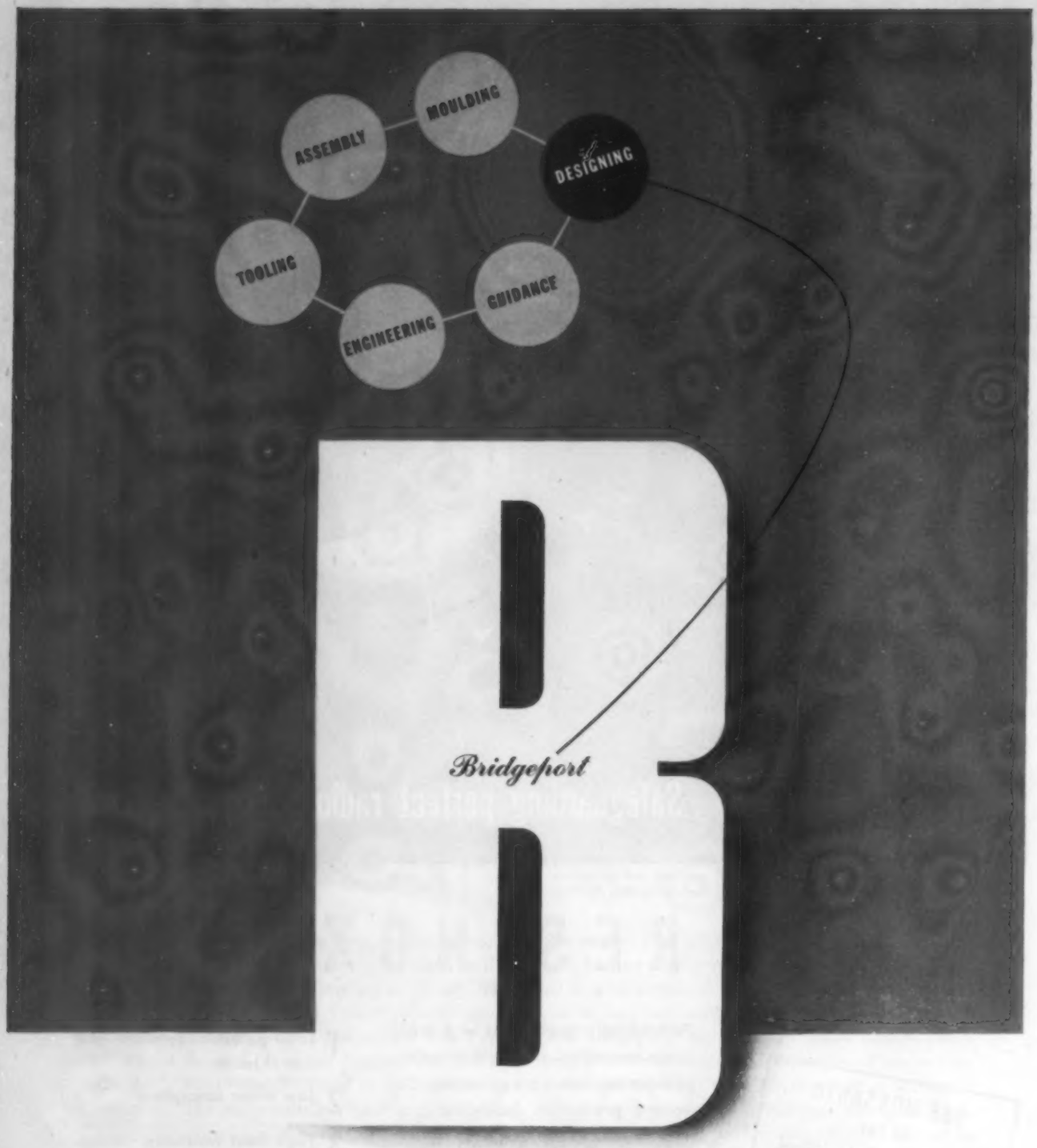
1. Low dielectric constant and power factor
2. Low water absorption
3. High heat resistance—important where leads are assembled to molded parts by a hot soldering iron.
4. Ease and economy in molding superior to ordinary mica-filled phenolics

Get full details from: MONSANTO CHEMICAL COMPANY, Plastics Division, Springfield 2, Mass. In Canada, Monsanto Ltd., Toronto, Montreal, Vancouver. Resinox: Reg. U. S. Pat. Off.

SEE MONSANTO AT THE *Plastics Exposition* CHICAGO IN MAY!

MONSANTO
CHEMICALS AND PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND



Designing is a service which offers your product added sales appeal. Tomorrow's market will look for and demand the last word in design. We are in a position to aid you in preparing for these markets. For plastics . . . think of Bridgeport.

BRIDGEPORT MOULDED PRODUCTS, INCORPORATED

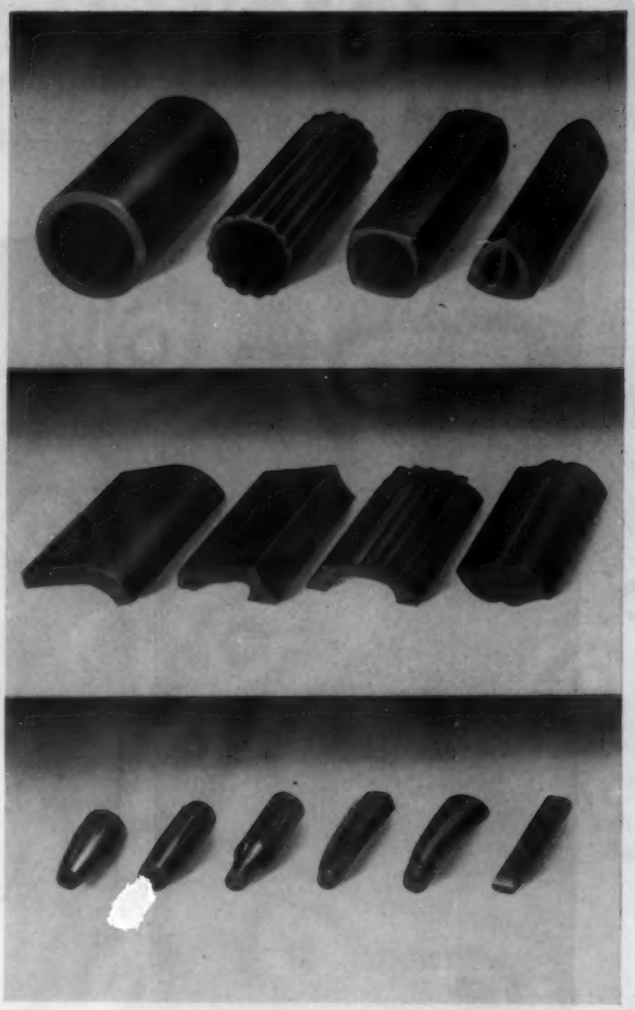
BRIDGEPORT CONNECTICUT

MARBLETTE

THE *Versatile* PLASTIC

A CAST PHENOLIC RESIN OF EXCEPTIONAL QUALITIES

- Outstanding among plastics, Marblette has a jewel-like depth and a complete color range which duplicates the appearance of precious stones, tortoise shell and ivory.
- Its almost infinite variety of colors is available in transparent, translucent, opaque, or in mottled effects. Marblette also comes in a waterclear form known as "Crystle" in a wide choice of colors.
- Marblette's machining characteristics, resistance to oil and acids, non-inflammability and exciting beauty make it ideal for countless manufacturing needs.



A few of the many types of Special Marblette castings made to customer's specifications.

SPECIAL CASTINGS

Marbelette is supplied in sheets, rods, tubes, and speciol castings such as cuttlery handles, kitchen utensil handles, pipe stems, cigarette holders, clock cases, automotive trimmings, jewelry items, buckles, etc. Special shapes made to customer's specifications can be supplied provided draft is all one way.

MARBLETTE LIQUID PHENOLIC RESINS

Casting Resins for Forming Dies and Tools

Metal Casting Sealing Resins

Bonding Resins

Low Pressure Laminating Resin

Bristle Setting Cement

Laminating and Insulating Varnish

Clear Phenolic Lacquer



MARBLETTE WILL HELP PLAN YOUR WORLD OF TOMORROW

The Marblette staff of Engineers offers its services to help with your manufacturing problems. Write to us outlining your needs.

THE MARBLETTE CORPORATION

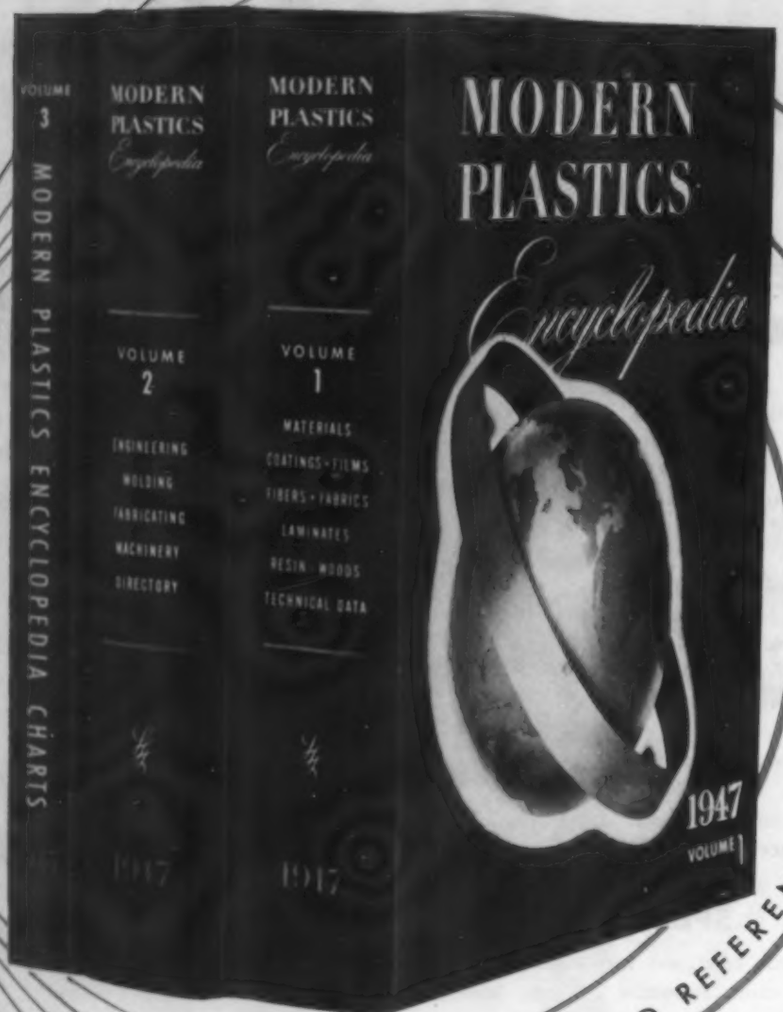
Manufacturers of Phenolic Resins Since 1929

37-21 Thirtieth St., Long Island City 1, N. Y.

COVERING THE PLASTICS MARKET FROM EVERY ANGLE!

PROFUSELY ILLUSTRATED!

MORE THAN 136 CHAPTERS!



THE YEAR-ROUND REFERENCE BOOK OF PLASTICS!

NEW AND EXCLUSIVE CHARTS! NEW MACHINERY, NEW TECHNIQUES!

WRITTEN AND EDITED BY AUTHORITIES! UP-TO-THE-MINUTE DIRECTORIES!

PUBLISHED IN 3 VOLUMES! LARGEST EDITION PUBLISHED!

PRICES:

$8.50 U. S.

$11.00 Canada (including duty and shipping.)

$12.00 Foreign

PLASTICS

ORDER YOUR COPY NOW!

THE ONLY ENCYCLOPEDIA OF PLASTICS IN THE WORLD

Will Be Published Soon!

1947 Modern Plastics Encyclopedia

The largest and most complete edition of the Modern Plastics Encyclopedia ever to be published, the 1947 Catalog will revive all the prewar grandeur and beauty, the color and richness for which previous encyclopedias were famous. Containing 12 sections which, in turn, are subdivided into 136 individual chapters, the 1947 Modern Plastics Encyclopedia will be published for the first time in 3 volumes, boxed and sold as a single unit to allow easier handling. This edition of the Modern Plastics Encyclopedia will be the largest ever published, numbering 1550 pages. It will reflect the increasing scope of the plastics industry, incorporating editorially all of the advances which have been made in plastics during the preceding year—in materials, machinery and techniques.

Cross-indexed for handy reference, the '47 Encyclopedia also contains the many special charts which are in constant demand for valuable information on plastics properties, solvents, plasticizers, synthetic rubbers, etc. There are also complete, up-to-date directories to every branch of the plastics industry. Written and edited by experts, the Encyclopedia is designed for use by the layman as well as by the technician. More than ever the 1947 Modern Plastics Encyclopedia is the authoritative reference book of the plastics industry.

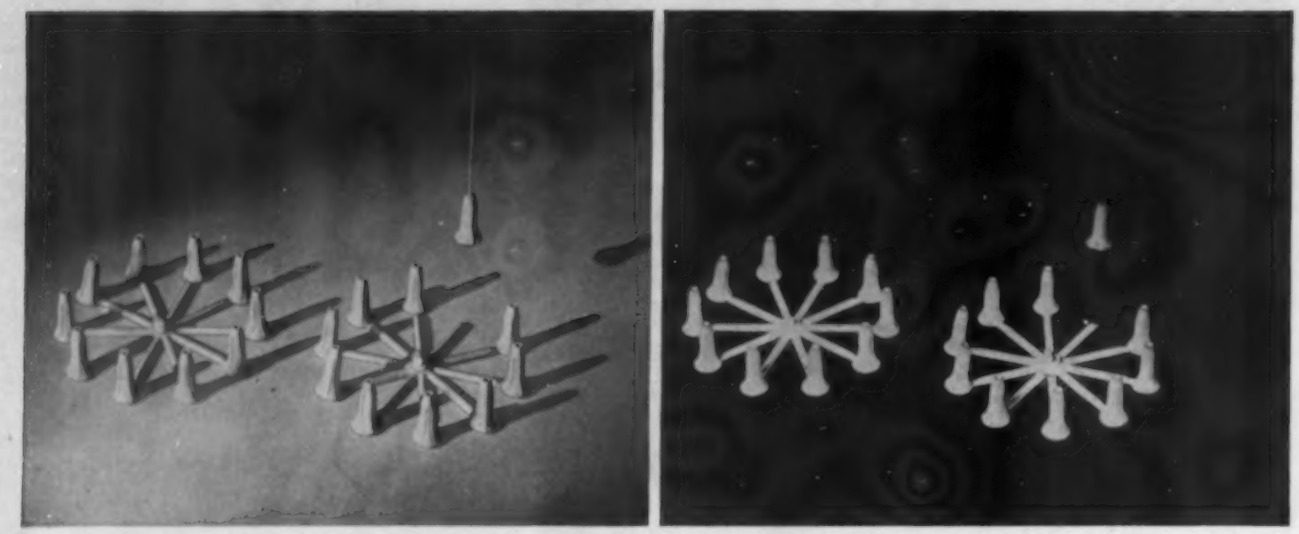
THE MUST BOOK FOR PLASTICS USERS
COVERING EVERY PHASE OF PLASTICS

- Plastic Materials
- Coatings and Films
- Synthetic Fibers
- Technical Data Section
- Laminates—Vulcanized Fibers
- Resin-Wood Products
- Engineering Design
- Molding—Extruding—Casting
- Fabricating—Finishing—Assembly
- Machinery—Equipment
- Bibliography and Glossary
- Directory
- Charts

CATALOGUE CORPORATION
122 EAST 42nd STREET • NEW YORK 17, N. Y.

Please send your remittance with order

Little DROPS of Light Point the Way at NIGHT



"Luminous" electric light pulls are easy to find in the dark, if installed where they are activated by daylight or lamplight energy. The two sprues of pull drops (shown above) are from the machines of the American Phenolic Corporation, who molded these useful items for the Agate Plastics Corp.

Horse Head* Luminescent Pigments Make these Plastic Products *"Luminous"*

HERE are two more plastic items that are easier to sell because they contain Horse Head Luminescent Pigments. The pigment in the plastic absorbs energy from daylight or lamplight, and then re-emits it as visible light. This afterglow, which lasts for hours, makes it easy to find objects in the dark, aiding safety and adding to the pleasure and convenience of living.

Among many other useful applications for *phosphorescent* pigmented plastics are lamp shades and fixtures, door knobs and escutcheons, radio cabinets and dials, flashlights, safety signs, table tops, curtains and such other items as slippers, apparel accessories, toys and novelties. The *fluorescent* types—those that require black light—are readily applied to displays and decoration, radio, aviation and automotive instrument dials.

Our technical staff is ready to work with you, your molder or plastics supplier on any phase of luminescent plastic applications.

*Reg. U. S. Pat. Off.





"Luminous" SPOOQUOITS provides fun for all —an old, popular game with a new twist provided by Horse Head Phosphorescent Pigments. (Manufacturer: Mason, Beall & Horton, Inc.)

Luminescent molding granules and powders, laminates, sheets and films are available from leading plastic manufacturers. Names on request. (The New Jersey Zinc Company does *not* produce plastics—we supply Horse Head *Fluorescent* and *Phosphorescent* Pigments to plastic manufacturers.)

HORSE HEAD PRODUCTS
New Jersey zinc

THE NEW JERSEY ZINC COMPANY

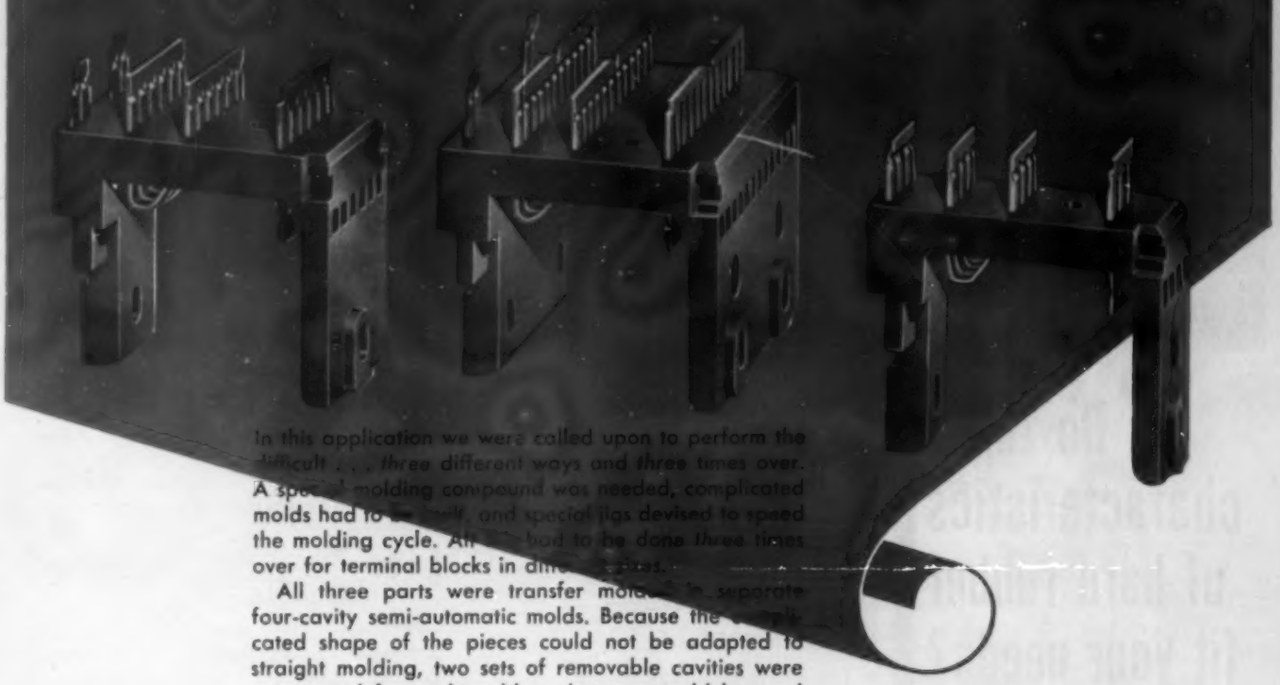
160 FRONT STREET • NEW YORK 7, N. Y.

***Products Distributed by* THE NEW JERSEY ZINC SALES COMPANY**

NEW YORK • CHICAGO • BOSTON • CLEVELAND • SAN FRANCISCO • LOS ANGELES

PRECISION ...IN TRIPLICATE!

In Material Development . . . In Mold Construction . . . In Plastic Processing



In this application we were called upon to perform the difficult . . . *three* different ways and *three* times over. A special molding compound was needed, complicated molds had to be built, and special jigs devised to speed the molding cycle. All work had to be done *three* times over for terminal blocks in different sizes.

All three parts were transfer molded in separate four-cavity semi-automatic molds. Because the complicated shape of the pieces could not be adapted to straight molding, two sets of removable cavities were constructed for each mold so that one could be used for molding while the other was being dismantled in specially designed disassembly jigs. Thus a continuous production cycle was maintained.

To meet the need for a free-flowing phenolic with good electrical properties, heat resistance and impact strength, our laboratory compounded a new material that in actual tests has surpassed all previously used commercial compounds.

So, whether your new problem in plastics be simple or three-fold, you can rely on Consolidated experience and know-how together with the complete facilities at our disposal to bring you a sound and ready answer. Inquiries invited.

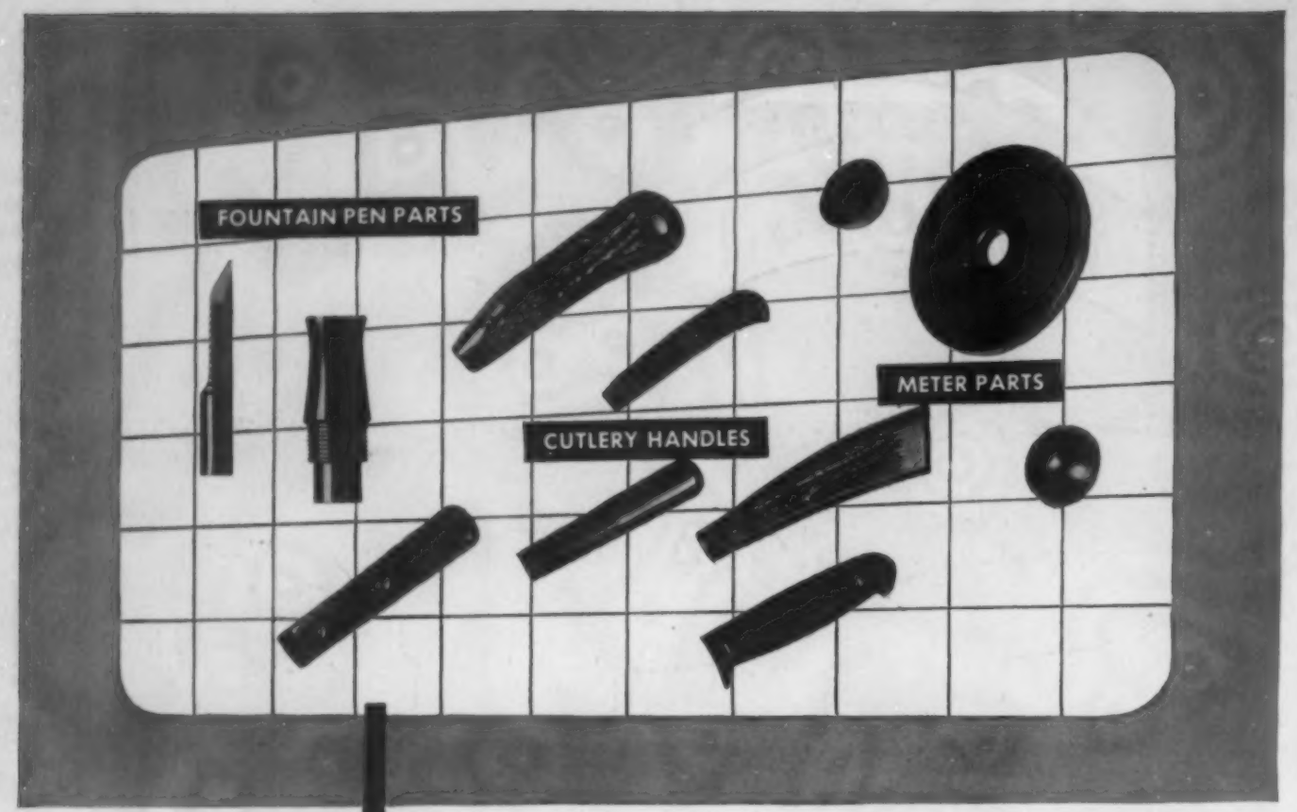
Terminal blocks pictured herewith were molded of X-208F for the International Business Machines Corp.

"Your Blueprint in Plastic"

Consolidated
MOLDED PRODUCTS *Corporation*
309 CHERRY STREET, SCRANTON 2, PA.

PRODUCT DEVELOPMENT • MOLD DESIGN • MOLD CONSTRUCTION • PLUNGER MOLDING • TRANSFER MOLDING • INJECTION MOLDING • COMPRESSION MOLDING

Branches: NEW YORK, *1790 Broadway* • CHICAGO, *549 W. Randolph St.* • DETROIT, *550 Maccabees Bldg.* • CLEVELAND, *4614 Prospect Av.* • BRIDGEPORT, *211 State Street*



Do these characteristics of hard rubber fit your needs?

In checking the reasons why these manufacturers use hard rubber for parts or products, you may discover a profitable application of your own.

1. Stability when in contact with oil, water, heat, cold and changing temperatures.
2. Resistant to the action of alkalies, hot soap solutions and most solvents and acids.
3. Good machining qualities.
4. Excellent molding qualities.
5. Finishes to a lustrous ebony.
6. Excellent resistance against chipping, splitting and cracking under normal usage or when dropped.
7. Price: Hard rubber is often cheaper, all things considered, than other plastics which were investigated for these applications.
8. Supply: Increasing in both natural and synthetic rubber.

Do you need a lot of something like these parts?

If you are planning or using large quantities of a product that approximates these parts in size, shape, physical and chemical requirements . . . or something which may gain added appeal from that certain satisfying "heft" and "feel" of hard rubber . . . chances are that our experience and facilities for large volume production will enable us to fill your needs at reasonable cost.

Might be worth exploring.

PLASTIC USERS PLEASE NOTE

Injection molding capacity available

Another section of our expanding plastics facilities has been completed. The latest model Watson-Stillman, Impco and Lester injection molding presses—8, 12 and 16 ounce capacity—are ready to go to work for you.

If you would like a sales engineer to call and discuss your needs, please write Dept. A-1.



VULCANIZED RUBBER AND PLASTICS COMPANY

formerly . . . The Vulcanized Rubber Company

Manufacturers of Rubber and Molders of Plastics

General Offices: 4 E. 29th Street New York 16, New York

Precision and quality a requisite at ...

ARNOLD

Brilhart

LTD.



It is our continued policy to manufacture quality items using a carefully selected choice of the proper materials.

If your job requires precision tooling and quality molding, machining and finishing, don't hesitate to take advantage of our experience in this field.

For your tough plastics problems

In Compression, Injection, Transfer Molding and Precision Machining.

ARNOLD BRILHART, LTD. · MINEOLA, NEW YORK

Saran BY NATIONAL

MONOFILAMENTS FOR BETTER UPHOLSTERY FABRICS



THE smartest public places are adding a new drawing-card to their bill of fare! It's upholstery woven of SARAN monofilaments . . . colorful, smart and exceedingly practical.

In a range of glorious colors, from soft pastels to vivid hues, SARAN may be woven into a variety of textures and patterns to create an interior decorator's dream for hotels, restaurants, theatres and other public places.

Fabrics woven of SARAN monofilaments won't stretch and sag in ordinary usage. They resist dirt, stains, alcohol and most acids. Consequently, they reduce maintenance costs to a minimum.

Public places become show places that attract and hold new customers with the installation of upholstery woven of SARAN BY NATIONAL.

■ SARAN BY NATIONAL denotes monofilaments, rattan and tape produced from Saran (vinylidene chloride resin by Dow) and supplied to mills, weavers and other fabricators for specific end uses.

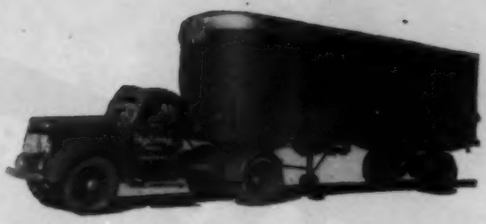
The NATIONAL Plastic Products Company

ODENTON • MARYLAND

NEW YORK: EMPIRE STATE BUILDING • LOS ANGELES: BANKERS BUILDING

HIGHWAY TRAILER CO.

Gets assembly into high



Independent investigator finds Phillips Screws cut driving time in half, stop costly driver slips, prevent accidents.



Fastening the roof trim with Phillips Screws instead of with bolts as formerly, which required a man inside and another outside the van. Now it's a one-man job, and in driving 38 Phillips Screws, he saves 15 minutes of the time he'd need to drive slotted screws.

"WHEN YOU'RE DRIVING 552 self-tapping screws on a big assembly job like our closed-van trailer, the Phillips Recessed Head makes a tremendous difference," the chief engineer told a James O. Peck Co. investigator making another survey of assembly savings with Phillips Screws in key plants.

"PHILLIPS SCREWS CUT DRIVING TIME IN HALF. It takes four men just 13 minutes to power-drive all the Phillips Head Self-tapping Screws that fasten the big plywood panels which line our 26-foot trailer vans. Because the driver centers automatically in the Phillips Recessed Head, an assembler doesn't have to be at eye level with the screw, as when using slotted screws. That eliminated the need for platforms which used to cut down working space and slow down the assembly.

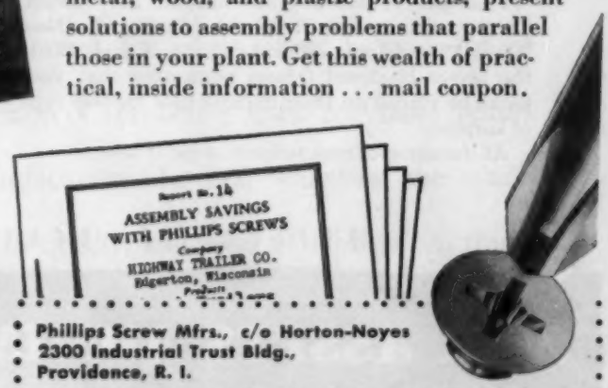
"SAVE DRIVER SLIPS that used to cost $2.50 to $3.50. These panels are fastened very near the edges. Before, when a bit slipped out of a slotted screw, the panel was usually split. Phillips Screws eliminated this cost completely.

"EASIER ON MEN'S HANDS. Our assemblers used to get hand cuts, often serious, when bits jumped out of slotted screws. That doesn't happen with Phillips Screws because the bit always centers snugly and stays."

THIS AND OTHER ASSEMBLY STUDIES covering metal, wood, and plastic products, present solutions to assembly problems that parallel those in your plant. Get this wealth of practical, inside information . . . mail coupon.



'Way down by the floor and 'way up to the roof . . . both ways Phillips Screws end the troublesome, time-wasting necessity of eye-level driving of slotted screws.



PHILLIPS Recessed Head SCREWS

Wood Screws • Machine Screws • Self-tapping Screws • Stove Bolts

23 SOURCES

American Screw Co.
Central Screw Co.
Continental Screw Co.
Corbin Screw Div. of American Hdwe. Corp.
The H. M. Harper Co.
International Screw Co.
Lamson & Sessions Co.
Milford Rivet and Machine Co.
Pheoll Manufacturing Co.
National Lock Co.
National Screw & Mfg. Co.
New England Screw Co.
Parker-Kalon Corporation
Pawtucket Screw Co.
Reading Screw Co.
Russell Burdsall & Ward Bolt & Nut Co.
Scovill Manufacturing Co.
Shakeproof Inc.
The Southington Hardware Mfg. Co.
The Steel Company of Canada, Ltd.
Sterling Bolt Co.
Stronghold Screw Products, Inc.
Wolverine Bolt Company

Phillips Screw Mfrs., c/o Horton-Noyes
2300 Industrial Trust Bldg.,
Providence, R. I.

Send me reports on Assembly Savings with Phillips Screws.

Name .....

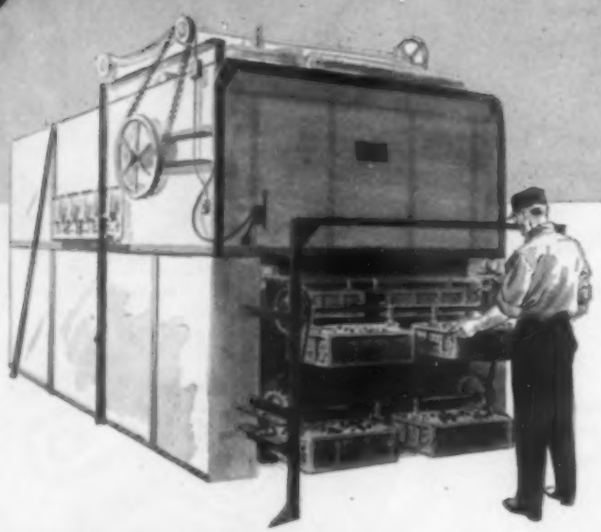
Company .....

Address .....

MP-15

WAA OFFERS AT LOW COST

Industrial Ovens



Baking and drying ovens, of specifications, sizes and types in common use but which today are not readily available, can now be purchased for prompt delivery from the War Assets Administration. Regardless of your specialized requirements, the odds are in favor of your needs being satisfied from this extensive surplus stock. Prices are so low that ovens may be converted from their original use when this is desirable and still permit a substantial saving to the purchaser.

There are ovens for the following uses: for baking lacquer, enamel, synthetic resin, japanning, for low temperature metal heat treating, for drying and curing chemicals, rubber, paper, lithographing, plastics, ceramics, etc.

Principal inventories are located at: Boston, Chicago, Cincinnati, Cleveland, Minneapolis, New York, Philadelphia, Richmond, St. Louis. Write the above Regional Offices requesting that your name be placed on their mailing lists for this type of surplus.

All furnaces offered subject to prior sale.

ALL FURNACES are sold under existing priority regulations. VETERANS OF WORLD WAR II are invited to be certified at the War Assets Administration Certifying Office serving their area, and then to purchase the materials offered herein.

EXPORTERS: Your business is solicited. If sales are conducted at various levels, you will be considered as a wholesaler. Any inquiries regarding export control should be referred to Office of International Trade, Department of Commerce, Washington, D. C.

See our display booth
at Western Metal Exposition and Congress Show
at Oakland, California, March 22 to 27, 1947.

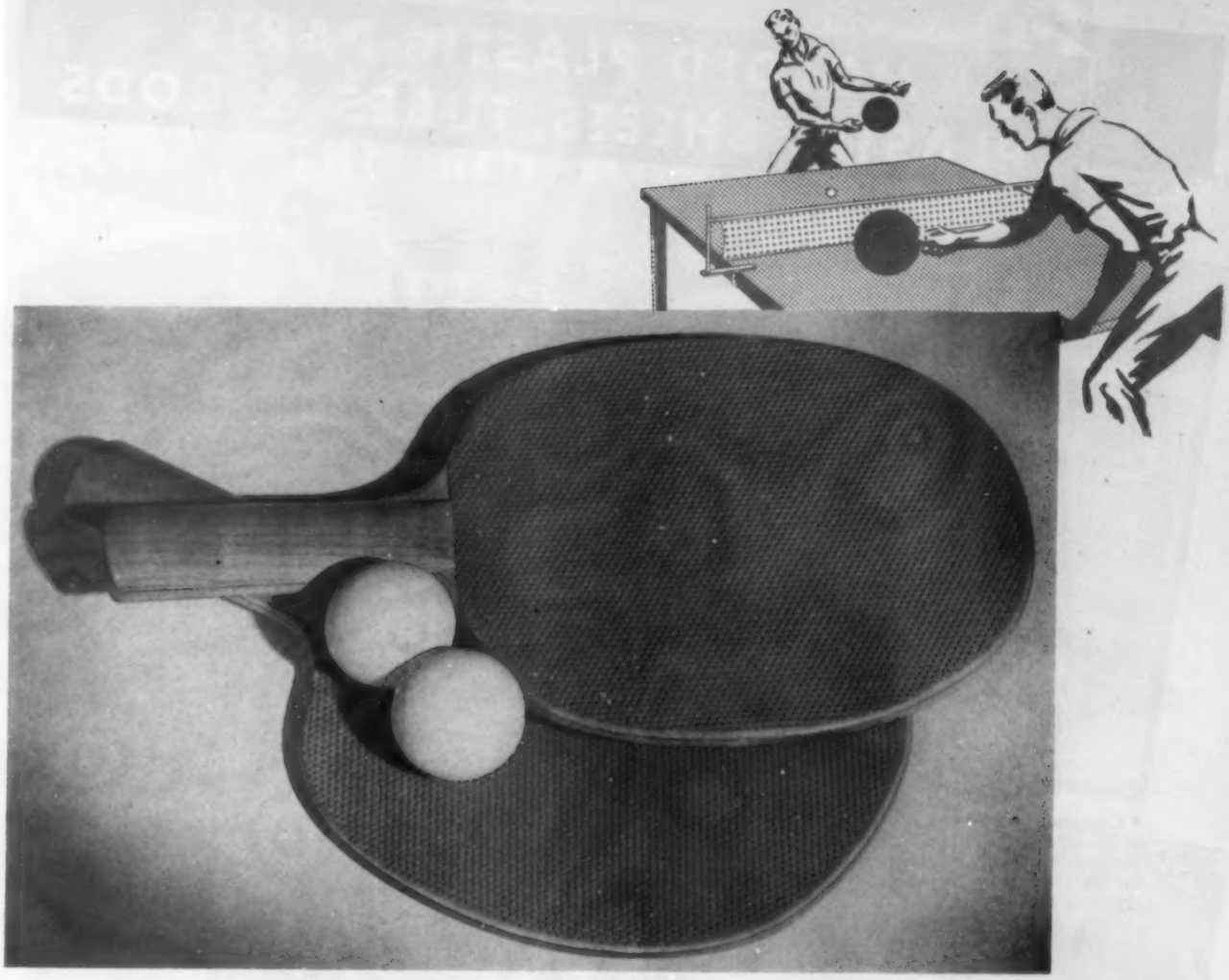
OFFICE OF GENERAL DISPOSAL

WAR ASSETS ADMINISTRATION

GOVERNMENT WAA SURPLUS

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Dallas Denver • Detroit • Fort Worth • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • New York • Omaha • Philadelphia • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Tulsa

838-3



NIXON C/N can take a PADDLING

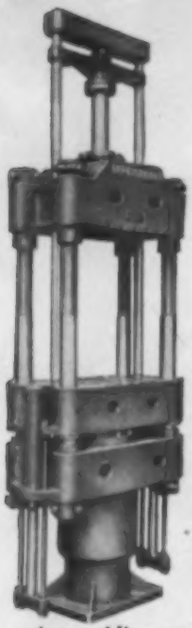
Nixon
C/N CELLULOSE NITRATE
C/A CELLULOSE ACETATE
E/C ETHYL CELLULOSE
Plastics

Nixon C/N (Cellulose Nitrate) is a tough, resilient plastic. It can take a lot of abuse or, when used for table tennis balls, a lot of paddling. You will find Nixon C/N being used for table tennis balls by several leading manufacturers. In fact, whenever the specifications call for toughness, flexibility, and ease of fabrication, think of Nixon C/N. It may meet your requirements perfectly.

NIXON NITRATION WORKS • NIXON • NEW JERSEY

Representatives: New York, Chicago, Detroit, St. Louis, Leominster • *Sales Agents*: NORTHWEST PLASTICS INDUSTRIES: Portland, Oregon, Seattle, Washington
Canadian Distributors: CRYSTAL GLASS AND PLASTICS, LTD., Toronto, Can. • *Export Distributors*: Omni Products Corporation, 40 E. 34th St., New York, N.Y.

MOLDED PLASTIC PARTS
PLASTIC SHEETS, TUBES & RODS

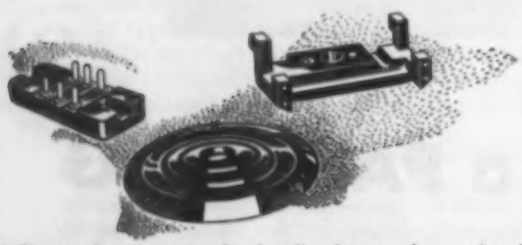


• Compression molding press with overhead cylinder for ejecting and for operating transfer platen, ranging in ram sizes from 5" to 18" diameter and up.

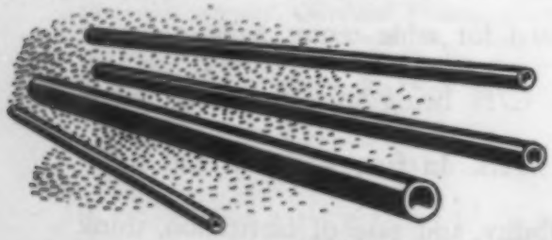
BIRDSBORO HYDRAULIC

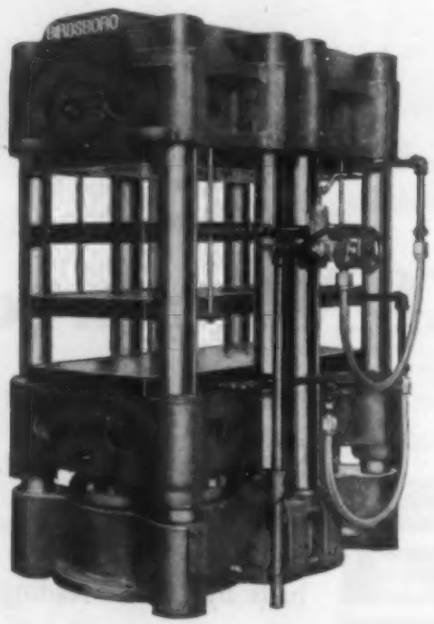
• Together these two Birdsboro Hydraulic Plastic presses are representative of a variety of available designs of presses for compression molding and laminating work.

Consult Birdsboro on your post-war requirements regarding all types of hand-operated or automatic compression molding and laminating presses. Write us today.



• Steam platen presses for laminating work, ranging in sizes having 12" x 12" to 50" x 110" platen areas.





BIRDSBORO STEEL FOUNDRY & MACHINE CO., BIRDSBORO, PA.

BIRDSBORO

HYDRAULIC PLASTIC PRESSES

IN THE METALWORKING INDUSTRIES

THE MAGAZINE EDITED FOR THE MEN WHO DECIDE:



Which Material?

(WHOSE MATERIAL)

Magnesium or Metal-Wood Composites!





What Method?

(WHOSE EQUIPMENT)

Drilling or Punching!



REINHOLD PUBLISHING CORP.
330 W. 42nd St., New York 18, N.Y.

Also METAL INDUSTRIES CATALOG
CHEMICAL ENGINEERING CATALOG
PROGRESSIVE ARCHITECTURE-PENCIL POINTS

Advertising Managers for
INDUSTRIAL & ENGINEERING CHEMISTRY
CHEMICAL & ENGINEERING NEWS

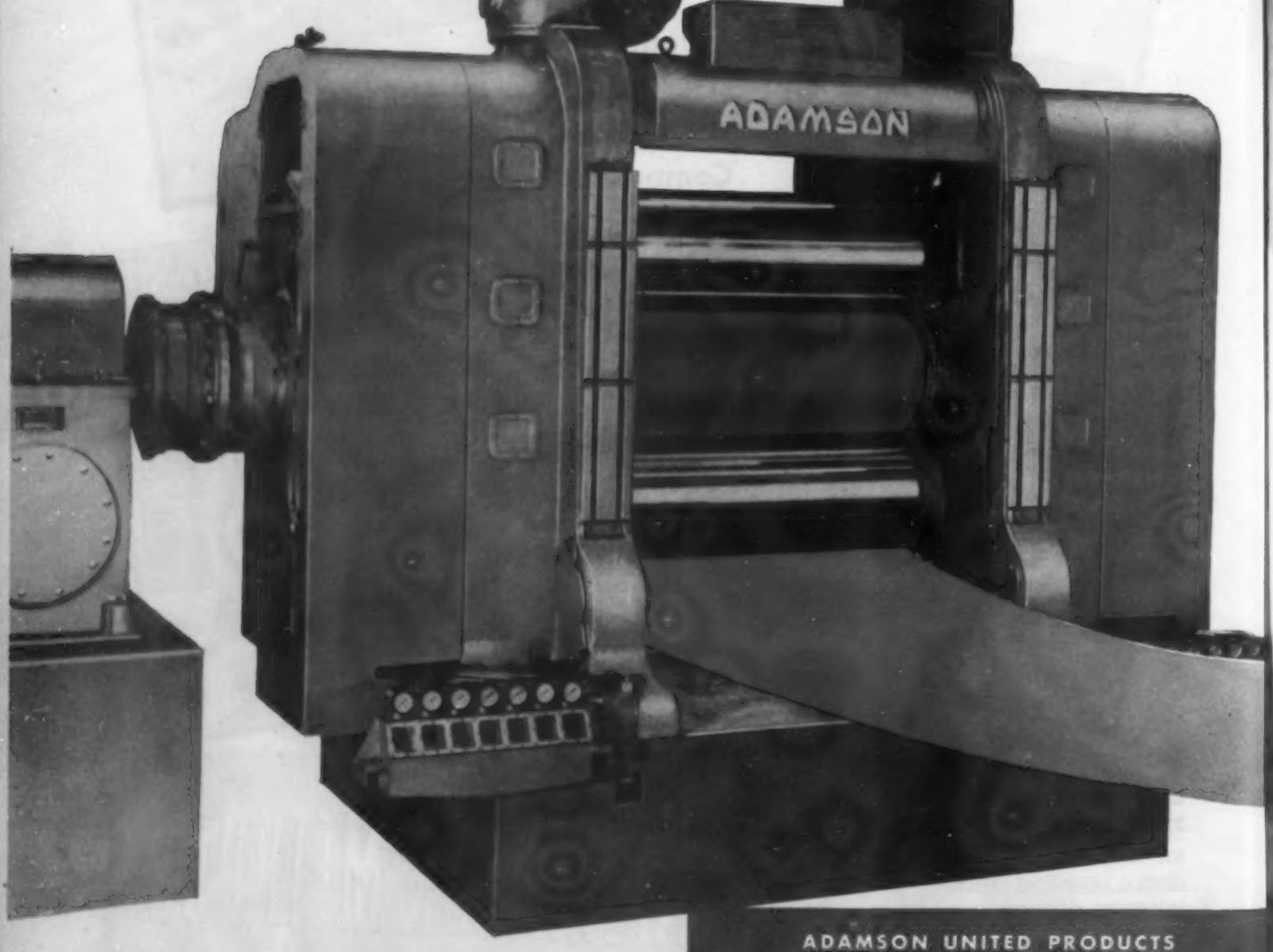
MATERIALS & METHODS

THE METALWORKING INDUSTRIES ENGINEERING MAGAZINE

METALS ALLOYS



new Adamson Calenders



24" x 68" Standard 4-Roll Calender with flood lubricated roll bearings; even and friction connection gears, and Cone Worm Drive direct connected to middle roll.

ADAMSON UNITED PRODUCTS FOR THE PLASTICS INDUSTRY

- Calenders for plastic film or coated fabrics—roll sizes
- Cooling Rolls for calendered film
- Wind-ups for calendered film
- Cut-offs for rigid plastic sheet
- Festoons or Storage Compensators for plastic coated fabrics
- Wind-ups for calendered fabrics
- Embossing Calenders
- Mixing Mills—roll sizes up to 28" x 84"
- Autoclaves with quick opening doors
- Plywood Presses
- Full line hydraulic presses, pumps and accumulators



Calender Assembly Floor, New Castle Plant.
24" x 68" Std. 4-Roll Calender in foreground . . . three Precision Type 4-Roll Calenders in background.

For sheeting unsupported Plastic Film

These entirely new Calenders produce film of varying thicknesses ranging from extremely low gauges up to rigid sheets. They permit higher and more uniform roll temperatures so that wider sheets can be calendered. Uniform gauges across width of sheet are maintained with no change in roll crown.

THE NEW 24" x 68" STANDARD 4-ROLL CALENDER

This modern unit is ideally suited for the manufacture of standard types of unsupported film and for the coating of fabrics. It is capable of producing the finest quality product at high production speeds. Some outstanding features are:

- **High capacity drive direct-connected to center roll.**
- **Pre-loaded roll bearings.**
- **No-leak oil seals.**
- **Temperature control of bearing lubricant.**
- **Precision roll adjustment.**
- **Pre-loaded adjusting screws.**
- **Rugged frame; oversize bearings.**
- **Compact floor arrangement.**

ALSO A NEW PRECISION TYPE 4-ROLL CALENDER

Carefully selected and pre-loaded roller bearings support the rolls with no bearing clearances and are adjusted for high temperature operation. Hydraulic jacks positively position the bearings against the adjusting screws. Precision Cone Worm reduction units and individual motors operate each adjusting screw.

Rolls are separately driven from a gear stand through universal couplings, allowing free adjustment without disturbing the position of the gears. These operate in a separate case, and on fixed centers, so that teeth can be cut with a fine pitch.

The *Roll axes are crossed* by a special cambering attachment. This compensates for roll deflections due to varying stock plasticities or Calender speeds, and avoids the necessity of re-grinding rolls to different crowns for any of these changing conditions.

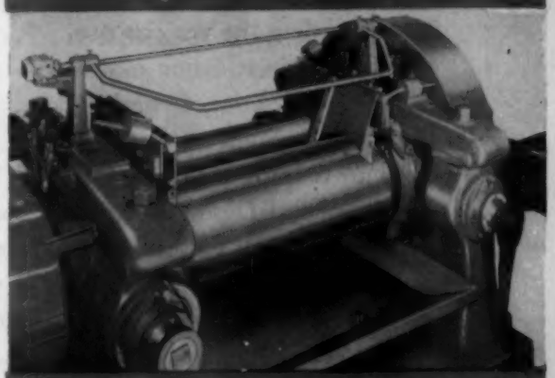
The rolls, with their anti-friction bearings, can be quickly detached from the universal couplings and removed from the frames. A special roll-changing device can be provided for this purpose.

We design and supply entire calendering process systems including all accessory equipment. To assure our customers the earliest possible delivery of precision-built plastics processing equipment, we have combined the facilities of six great plants, each operated by personnel with years of experience in the building of heavy machinery. From these plants the various components of steel and iron castings, gears, chilled iron rolls and other parts are assembled at New Castle.

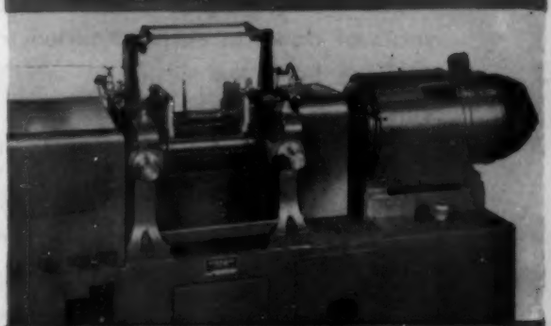
Complete details on the Calenders and Mills illustrated, or on any other equipment we manufacture, will be furnished on your request.



Modern 26" x 84" Mill equipped with self adjusting center guide and pneumatically operated roll scraper which can be moved against or away from roll by operation of foot treadle or hand valve.



New, Heavy-Duty 24" x 60" Standard Mill for mixing and blending raw materials prior to calendering. It is equipped with oil flood lubrication . . . triple oil seals on all bearings and tiltable, easily cleaned stock guides. Can also be furnished in 16" x 36" or 20" x 48" sizes.



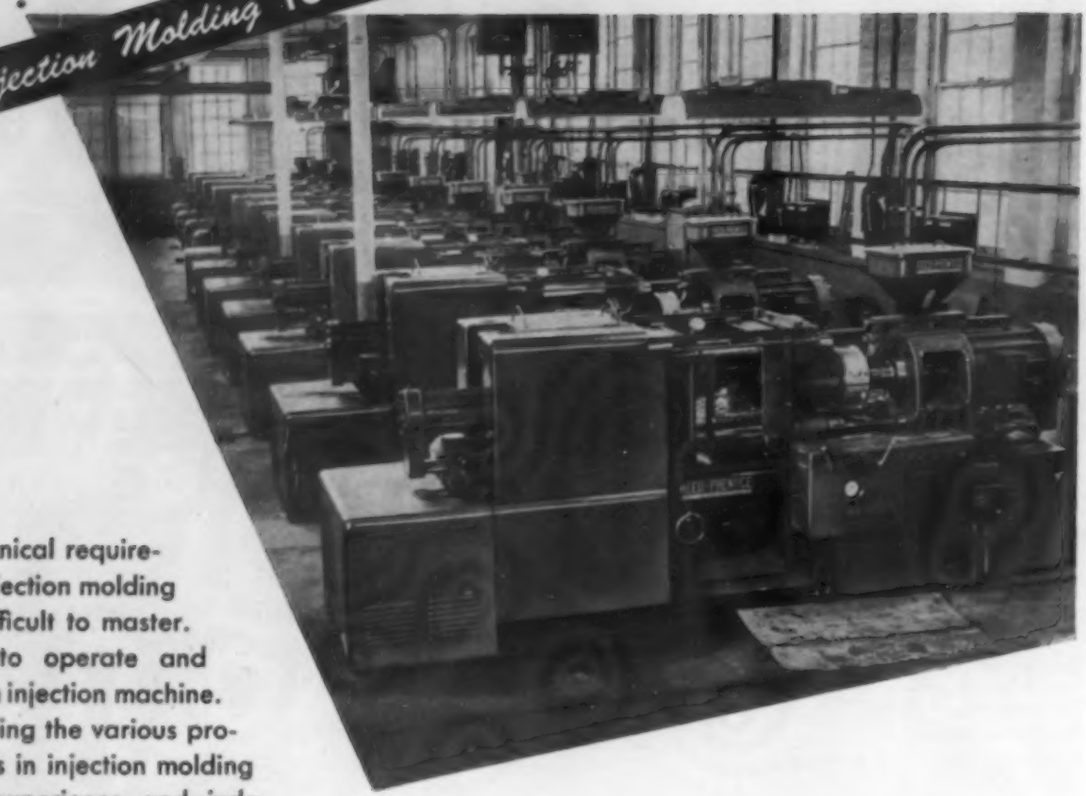
Very late model 8" x 16" self-contained Lab. Mill incorporating many features wanted by research laboratories. Furnished on cabinet with all controls mounted flush on front cabinet panel. Has flood lubricated bearings . . . triple oil seals . . . tiltable stock guides. Can also supply in 6" x 13" or 12" x 24" sizes.

ADAMSON UNITED COMPANY
AKRON, OHIO

SUBSIDIARY OF UNITED ENGINEERING AND FOUNDRY COMPANY

Plants at: PITTSBURGH • VANDERGRIFT • NEW CASTLE • YOUNGSTOWN • CANTON

Where Injection Molding IS AN ART – NOT A SCIENCE!



The mechanical requirements of injection molding are not difficult to master. It's easy to operate and maintain an injection machine. But controlling the various process factors in injection molding demands experience and judgment. That's what makes injection molding an art.

Here at A. J. Desimone Corporation, we have learned this art the hard way. That's why we are able to turn out your custom molding jobs with speed, accuracy and at the same time achieve the quality you expect.

We have the equipment—15 Reed-Prentice injection presses. We have the men—our own capable engineering staff with more than 20 years of down to earth experience with plastics. And we have the desire to serve you promptly, efficiently and economically. We'd like to prove to you how we make injection molding an art!

A. J. DESIMONE *Corporation*

MOLDERS of PLASTICS

180 PUTNAM ST. • PATERSON 4, N. J.

UP with output
DOWN with spoilage

Yes, by use of Fellows-Leominster Injection Molding Machines, you can boost your output to profitable new highs... and at the same time reduce your production costs.

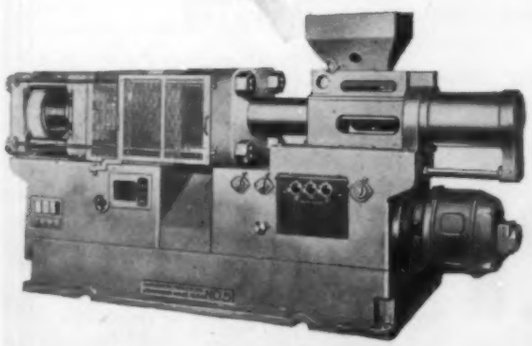
HERE'S HOW Performance is up because of accurate powder metering, efficient heat transfer for plasticising, and quick-acting controls to speed the molding cycle. Costs are down because of minimum formation of flash and low power consumption for operating and heating.

WHAT'S MORE You buy more than a machine when you pick a Fellows-Leominster. We are prepared to offer our machine customers a complete service including mold design and manufacture as well as machine installation and field service.

THIS IS WHY To make all this possible, the resources, engineering skill, manufacturing capacity, and distribution facilities of The Fellows Gear Shaper Company have been combined with the technical knowledge, patents, facilities, and special abilities of Leominster Tool Company, Inc.

For complete information, address your inquiries to The Fellows Gear Shaper Company, Head Office and Export Dept., Springfield, Vermont, U.S.A.... Branch Offices: 616 Fisher Bldg., Detroit 2... 640 West Town Office Bldg., Chicago 12. New England Distributor: Leominster Tool Co., Inc., Leominster, Mass.

Builders of Precision Machinery Since 1896



Leominster Injection Molding Machine No. 5, Series 44.

Fellows

LEOMINSTER

INJECTION MOLDING EQUIPMENT



Graduates of

PLASTICS INDUSTRIES TECHNICAL INSTITUTE

Resident School have received instruction in the following subjects:

	HOURS
Introduction to plastics, theory and practice	120
Fabrication shop, model making casting, machine shop practice	190
Plaster model and pattern making	92½
Industrial Arts Design	92½
Molding shop, compression and injection molding, laminating	190
Molding problems—cost estimating, theory, production scheduling	92½
Mold design—transfer, compression, and injection mold design	92½
Lectures and calculations on properties and chemistry of plastics	75
Lectures and theory of plant layout, hydraulics, surface coating design	75
Advanced theory and practice	450
TOTAL	1470

All training at Plastics Institute is practical, comprehensive, using industry type equipment in laboratories and shops. The newest methods are taught as soon as their application becomes practicable.

WE SUBMIT FOR YOUR CONSIDERATION, GRADUATES, many with actual industry experience, in all sections of the country. Write to the Plastics Institute office nearest you stating your requirements. We will endeavor to recommend the person best suited to meet your needs.

Forums, Resident School and Home Training
Courses APPROVED FOR VETERANS

Plastics
INDUSTRIES TECHNICAL INSTITUTE

For information write DEPT. MP7-3

NEW YORK 17, 122 E. 42nd St. ★ **CHICAGO 13,** 3810 N. Broadway ★ **LOS ANGELES 6,** 1601 S. Western Ave.



WHAT'S IN A HANDLE?

EXAMINE this Norton-molded plastic handle closely.

Looks as though it were simple to produce, doesn't it?

Actually a job of this sort calls for great skill on the part of the custom molder. First, he must satisfy strict design requirements which, although primarily functional in nature, call for a handle that blends perfectly with the lines of the finished product. Secondly, the molded handle must meet stringent mechanical requirements such as heat resistance, impact strength and pleasant "feel."

For years, Norton's experienced design engineers have been working closely with progressive, plastic-minded manufacturers representing practically all fields of industry... from cosmetics to household appliances.

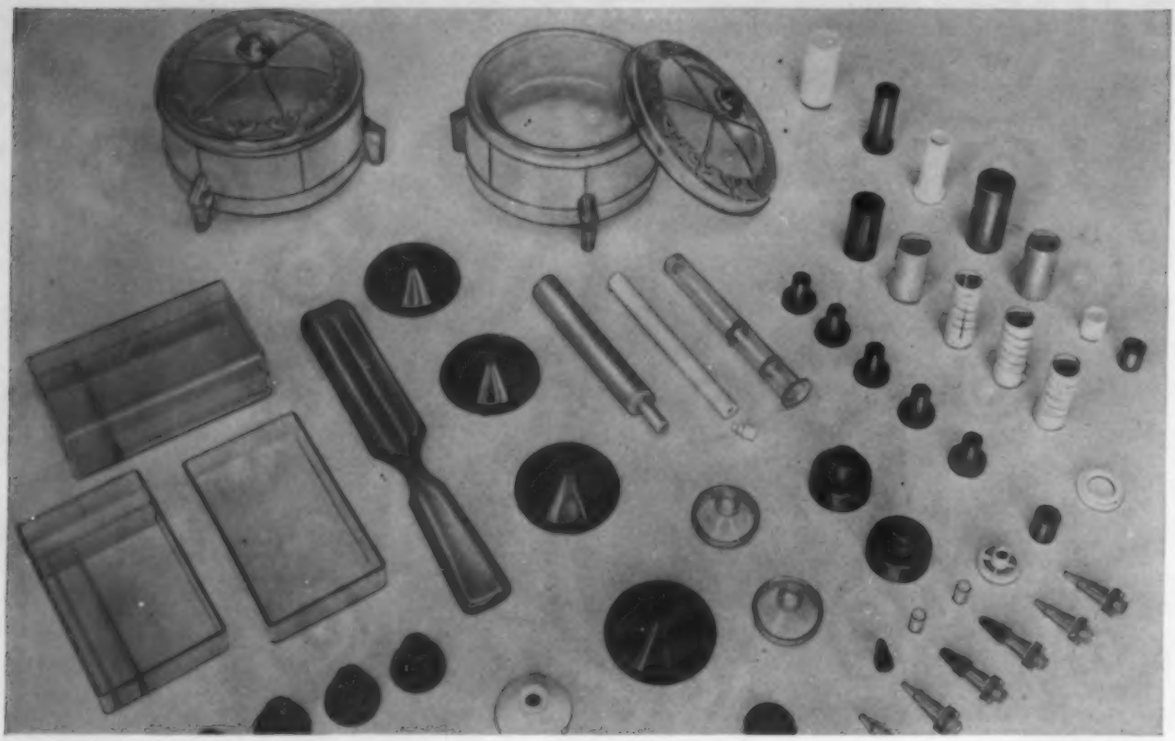
Combine this rich background of successful product development experience with the extensive facilities for compression and injection molding which are available here and you can easily understand why leading producers everywhere all look to Norton for their custom molding.

Why not send us a detailed description of your plastics problem? Norton Laboratories, Inc., Lockport, N. Y. *Sales Offices: 347 Fifth Avenue, New York City... 9 South Clinton St., Chicago.*

NORTON *Laboratories, Inc.*

COMPRESSION AND INJECTION MOLDING

WE DO EVERYTHING IN THERMOPLASTICS



...AND WE HAVE THE KNOW-HOW *(since 1919)*

...the plant

...and the talent

TO DO IT RIGHT!

Celluplastic is the standard by which the industry measures engineering intelligence and production efficiency—by which purchasing men measure correctnes of quotation. We invite you to talk over your product or packaging question with us and find out what Celluplastic—"the best place for plastics"—can do for you.

EXTRUSION
INJECTION
PRODUCTS
CONTAINERS
RODS
TUBING
TAPES
YARNS

CELLUPLASTIC

AMERICA'S #1 SOURCE OF PLASTIC CONTAINERS

CELLUPLASTIC CORPORATION

44 AVENUE L, NEWARK 5, N. J.

New York Office: 630 Fifth Ave. • West Coast: Container Service Co., Los Angeles 27, Cal.

...COMPLETE FROM IDEA TO FINISHED PRODUCT

light but TOUGH



WHEN you want resistance to impact in a plastic, try Chemaco Ethyl Cellulose. This light, colorful, smooth, easy-to-mold product can really "take it"! Even at minus 70°F, Chemaco Ethyl Cellulose retains its impact resistance and flexibility to a greater extent than any other cellulose plastic. It is also noted for excellent dimensional stability over a wide range of temperatures, as well as in the presence of high humidity. Its low water absorption factor contributes to its excellent dielectric properties.

Chemaco Ethyl Cellulose also offers an almost unlimited range of colors that go all the way through—solid colors . . . mottled colors . . . transparents . . . translucents . . . opaques.

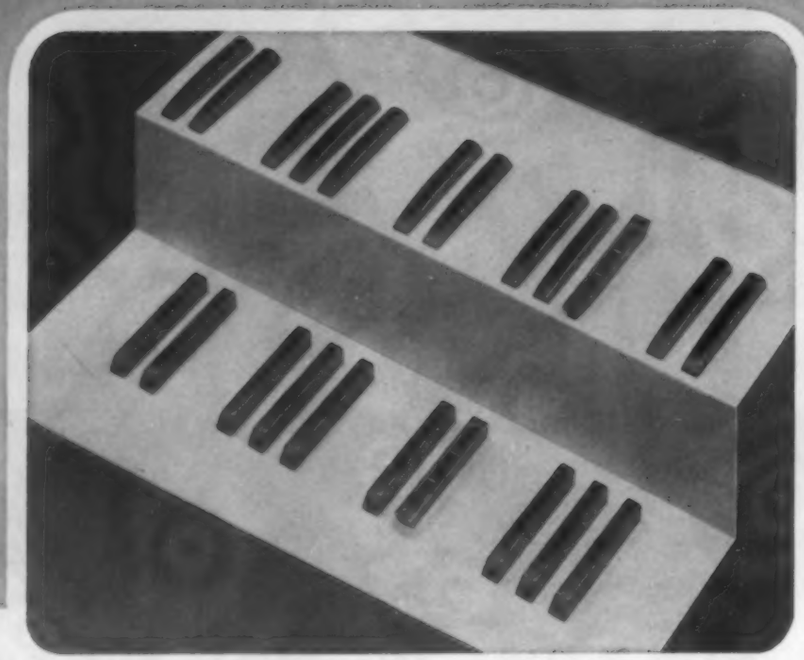
This amazing versatility, accompanied by faster, cleaner molding and 100% salvageability of material, makes Chemaco Ethyl Cellulose very helpful in solving mass production problems. May we help you? Chemaco Corporation, Berkeley Heights, N. J. Branch office in Cleveland.

Chemaco

ETHYL CELLULOSE
MOLDING POWDERS

ALSO MANUFACTURERS OF CELLULOSE ACETATE AND POLYSTYRENE

KEYS PIANISTS WANT TO TOUCH



Extra-smooth piano or organ keys with a flat and lustrous surface do not make virtuosos, but they do add to the ease and enjoyment of playing — and to the appearance of the instrument.

Shaw Insulator Company, among its many molding accomplishments, includes a special ability to mold handsome plastic piano and organ sharps. By means of Transfer molding, a Shaw development, phenolic keys with distinctive functional features may be produced at relatively low cost.

Transfer molding offers many unique advantages. Molds for the sharps are less costly, the pieces are produced on very fast cycles, and no finishing expense is required. Complete flatness is already present when the parts are removed from the mold — a feature unique with this molding process. Transfer molding can be used to produce many small, simple shapes at low cost with high quality. Extensive experience, combined with the latest improved equipment, enables Shaw to offer plastics for this and other applications previously considered uneconomical.

SHAW

SHAW INSULATOR COMPANY

MOLDERS QUALITY MARK ON MOLDED PLASTICS SINCE 1892

160 COIT STREET IRVINGTON 11, N. J.

PLASTICS LITERATURE AVAILABLE

Shaw engineers have prepared a variety of literature, study of which might help you to a decision. Simply write a note about what phases of plastics especially interest you.

Or, you may prefer at once to call in a Shaw engineer, and present your problems for his study. This company's fifty-five years of plastics experience gives him a rich background from which you can draw.

Between the resources of Shaw and the Plax Corporation, Hartford 5, Conn., you can obtain assistance in almost all plastics methods and materials.

TURN TO PLAX FOR PLASTICS

Plax supplies materials below in forms as checked. They are available in a full color range.	SHEET	ROD	TUBE	FIBER	BLOWN WARE	MACHINED PARTS
Cellulose Acetate	✓	✓	✓	✓	✓	✓
Cellulose Acetate Butyrate	✓	✓	✓	✓	✓	✓
Ethyl Cellulose	✓	✓	✓	✓	✓	
Methacrylate		✓	✓	✓		✓
Polyethylene	✓	✓	✓	✓	✓	✓
Polystyrene	✓	✓	✓	✓	✓	✓

Vinyls, Cerex, Styraloy, Plexene, and certain special copolymers are also available from Plax, as are special extruded shapes in most materials.

Plax is a leading source of plastics in sheet, rod, tube, and fiber blown forms — also machined parts. This ability of Plax to supply a wide variety of plastics in a wide variety of forms simplifies your task of obtaining the best type of material for your product. Plax offers you many unique plastics developments, such as the tough and flexible Polyflex* Sheet, Laminated Polyflex, and Polyflex fiber forms of polystyrene.

At your disposal, too, is expert advice on plastics applications by Plax engineers and a comprehensive library of technical data (see list of literature). These advantages point convincingly to the wisdom of turning to Plax for your plastics requirements — for both materials and the guidance you may need in their application.

*T.M. Reg. U.S. Pat. Off.

WRITE FOR THIS POLYSTYRENE DATA

How to Machine Plax Polystyrene Products.
How to Use Coolants with Plax Polystyrene Products.
How to Cement Plax Polystyrene Products.
How to Polish Plax Polystyrene Products.
Notes on Design and Assembly of Plax Polystyrene Products.
Die-cut Parts from Plax Polystyrene.
How to Form Plax Polystyrene Rod.

AND THIS PRODUCT INFORMATION

Data Sheets on Plax Cellulose Acetate, Cellulose Acetate Butyrate, Methacrylate, Polyethylene, Polystyrene and Ethyl Cellulose Products.
Article on Plax's Blown Products.
New special plastic shapes by Plax.

PLAX
FOR PLASTICS
NOT SUBSTITUTES···IMPROVEMENTS

133 WALNUT STREET ★ HARTFORD 5, CONNECTICUT



PLASTICS
ARE STILL FIRST CHOICE FOR MODERN STOVE PARTS

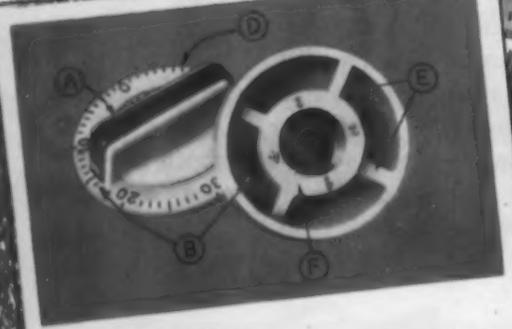












MOLDING MATERIAL

Urea resin was selected for these parts because of its high gloss. Its dimensional stability will be unaffected by the temperatures to which these parts are subject.

MOLDING METHOD

All parts are compression molded. The handle supports and gascock handles are made in 8 cavity molds; the timer, thermostat and broiler knobs in 6 cavity molds. Use of multiple cavity molds increases rate of production . . . lowers unit cost.

MOLD DESIGN

Channels (A) and slots (B) provide for easy attachment of metal inlay. Paint is applied by hand then wiped off leaving molded scales and type black (D). Ribs (E) provide structural strength. Key (F) locks knob and prevents slippage on shaft.

From past experience, the Marshall Stove Company knows the value of a snow-white, chip-proof finish. A finish that is as pleasing to the eye as it is to the touch. Plastics combine this lasting beauty with physical properties that insure long service and ease of assembly.

You may not be a stove manufacturer . . . but there is better than an even chance that *your* product can be improved by the use of plastics. AICO with over 30 years of molding experience . . . using all methods and all materials . . . is well qualified to advise you.

Aico
PRECISION MOLDING

This is number 31 of AICO's series of plastics applications. A request on your letterhead will bring you the set complete to date, on convenient file cards.

AMERICAN INSULATOR CORPORATION
New Freedom, Pa.
SALES OFFICES: Cleveland — Detroit — New York — Philadelphia

MANY THINGS ARE BETTER BECAUSE OF PLASTICS

MODERN PLASTICS
VOLUME 24 MARCH 1947 NUMBER 7

Is plastics' future tied to coal?

HOW far can the plastics industry expand? There is much glib talk to the effect that it can go on increasing indefinitely as long as ever abundant and inexpensive air, coal, limestone, salt are available.

Nevertheless many thoughtful persons are considerably concerned over the possibility of expansion even to meet the goals that have already been set—to say nothing of that hoped for time in the beyond when plastics become a leading material on a quantity basis.

Why are these students of the material supply concerned? The answer lies to a large extent in the future availability of coal chemicals or of a substitute for them.

Chemicals

Chemicals are divided into two great families—organic and inorganic. The former or carbon-containing chemicals, which are the only ones that concern us in this article, may be obtained from either coal or petroleum. To date only the coal chemicals have been exploited to any very great extent by the plastics industry.

Coal chemicals depend on steel

These coal chemicals—primarily benzol, phenol, cresol, cresylic acid and naphthalene—are basic necessities for phenolics, polystyrenes and for plasticizers for the vinyls. At present the chemical industry is dependent upon the steel industry for almost all these materials because they are products of the coking process. Coke is produced primarily by the steel industry for use in steel manufacture although a small amount comes from municipal gas plants. When coal is processed to obtain coke, the volatile matter is driven off and converted into gas, tar, light oils and ammonia. Most of the tar and light oils are subsequently refined to obtain the above-named chemicals (benzol, cresol, cresylic acid and naphthalene).

Inasmuch as coke is the product sought for, the other materials rate as co-products. So far it has been uneconomic to process coal for the sole purpose of obtaining chemicals. Until these economics are changed there is not going to be an increase in coal chemical production except as determined by the need for coke. Of course it is possible that if the price for chemicals goes high enough to induce coking for co-products alone, the chemical price might then be so high as to put some portions of the plastics industry out of business, or send them on a frantic search for other materials to use in place of coal chemicals.

Chemicals from petroleum

There is a very similar situation existing in the petroleum industry. The present market price, established by coal chemicals, is, with few exceptions, below the level at which petroleum chemicals can compete. As long as the oil companies can make more money selling motor fuel and lubricating oil they are not going to set up high priced equipment to manufacture chemicals for plastics.

For the benefit of our readers, we have made a study of this present situation and focused our attention more on long range than on immediate needs—in other words we are looking more at 1950 and 1955 than at 1947 and 1948. With this end in view we are pointing up conditions as they exist today and indicating the problems that must be solved if the plastics industry is to grow

A large portion of the chemical industry is now dependent upon the steel industry for by-products of the coking process. The effect that this dependence may have on the expansion of the plastic industry has been the subject of considerable speculation.

A study of the present situation—with attention focused more on long range than on immediate needs—seems to show that whatever ceiling may be imposed on plastics expansion by the fact that so many of the needed chemicals are by-products of steel production is only temporary. There are other sources from which the needed chemicals can be obtained if the demand is enough to justify the capital investment of bringing them in.

The transition period, however, may well be difficult.

into the giant that its optimistic backers believe to be possible.

Starting then with the situation in steel, we find the following table gives pertinent information:

YR.	STEEL INGOT	COAL TAR FROM COKE	BENZOL
	tons	gal.	gal.
1937	57,000,000	603,000,000	
1944	89,000,000	772,000,000	178,000,000
1945	80,000,000	696,000,000	156,000,000
1946	66,000,000	600,000,000	135,000,000

[a] Not including motor grade

It can be easily seen that the ratio of increase in coal tar production is not equal to the ratio of increase in steel production. While steel production was increased 50 percent over its prewar high during hostilities, coal tar production went up less than 30 percent.

Authorities offer a number of explanations for this situation. Among the reasons is the present faster-than-normal operation of coke ovens due to heavy demands for steel; and fast operation reduces the amount of coal chemicals obtained. Then, too, coke ovens are worn out from excessive operation which, in turn, decreases the yield of coal chemicals. Use of poorer quality coal for coking results in a lowering of the average number of gallons of coal chemicals obtained per ton of coal. The average for good coal is 8 gal. with the quantity ranging from 6 to 12 gal. depending upon volatile matter of the coal. Perhaps the greatest factor contributing to the low ratio for coal derivatives is the use of bee hive coke ovens (from which no chemicals are recovered) for a portion of the coke needed when demand for steel is above normal requirements.

Many of these factors, of course, were the products of the wartime emergency. It can be anticipated that the ratio of coal tar produced per ton of coke may increase slightly when new ovens come in and slower coking is practiced. However, that increase may be offset by new processes for increased use of oxygen in blast furnaces which will decrease the amount of coke required.

Markets for tar

The volatile matter from coke production contains gas, tar, light oils and ammonia. Except to show that the producer must find a market for his gas and ammonia as well as other materials we are concerned only with tar and light oils.

From the tar, which a producer of coke may distill himself or sell to other distillers, is obtained natural phenol, cresols, cresylic acid, naphthalene, creosote oil and pitch. In addition, great quantities of this tar are burned as fuel by steel processors. In 1945 almost one fifth of the coal tar from coke ovens was burned; in prewar years the percentage was higher because steel men found it cheaper to burn tar than to buy fuel.

Another sizable portion of the tar is used on highways. This portion, however, has been largely stripped of its chemical content.

Outlets for the light oils

From the light oil portion of coal distillation are derived benzol, toluol, xylol and some naphthalene—the most important to the plastics industry being benzol. From 65 to 75 percent of the light oil distilled from coal ends up as benzol. However, despite this high percentage, one of the chief producers told this magazine's reporter that the outside limit for pure benzol production from coke under normal conditions in the United States would not be much over 150,000,000 gal. a year. This compares with a yearly disappearance of benzol through 1943, 1944 and the first half of 1945 of between 190,000,000 and 255,000,000 gallons. A large portion of this was imported, coming chiefly from the United Kingdom and reported to be motor grade benzol.

Benzol or benzene (used interchangeably) is in demand for styrene used in synthetic rubber and polystyrene, for resorcinol, adipic acid used in nylon, for phenol, dyes, medicinals, rubber processing, camphor and a few other scattered products.

The wartime benzol was distributed approximately as follows: 47.5 percent for aviation gasoline; 19 percent for styrene; 12 percent for phenol; 6 percent for aniline; 2.5 percent for chlorobenzene and 2.3 percent for phthalate plasticizers, maleic anhydride, camphor, resorcinol and other chemicals.

The percentages are known to have changed considerably for 1946 although complete figures are not yet available. For example, benzol is no longer necessary in aviation gasoline and the amount used in automotive fuel is very small.

Much of the so-called motor grade oil is almost the dregs of the distilling process, containing such a tiny amount of pure benzol that this is not worth the cost of extraction. According to U. S. Tariff Commission reports, some 40,000,000 gal. out of the 1946 production of between 175,000,000 and 180,000,000 gal. of benzol were motor grade and not used in the further production of chemicals although there are differences of opinion on this subject. Some critics say that much of the motor grade comes from plants that do not have facilities for refining light oil into chemical grades.

STYRENE

As for the styrene monomer used in synthetic rubber and polystyrene, the rated capacity of all the so-called government styrene plants (the two 50,000-ton capacity Texas plants have been purchased by Monsanto Chemical Co. and Dow Chemical Co. while the 37,500-ton plant at Kobuta, Pa., has been bought by the Koppers Co., Inc.) plus Dow's private plant at Midland, Mich.,

The benzol figures in the column at the left of this chart show the amounts that would be required for the production of varying amounts of polystyrene and synthetic rubber

BENZOL REQUIRED	POLYSTYRENE		GR-S SYNTHETIC RUBBER
70,000,000 gal.	75,000 tons	+	500,000 tons
74,375,000 gal.	150,000 tons	+	250,000 tons
109,375,000 gal.	250,000 tons	+	250,000 tons
154,000,000 gal.	250,000 tons	+	500,000 tons

has been estimated as 200,000 tons. The 10,000-ton Canadian plant uses Canadian benzol. The 25,000-ton California plant is reported to have used petroleum benzol during the war, derived from a small oil field in the area which produced a grade of petroleum from which benzol could be fractionally distilled at the same time as other products. Another 25,000-ton styrene plant at Institute, W. Va., has been closed.

Thus, the present reported capacity of styrene plants in the United States using benzol from coal is:

Dow at Velasco and Midland	62,500 tons
Monsanto at Texas City	50,000 tons
Koppers at Kobuta, Pa.	37,500 tons
GRAND TOTAL	150,000 tons

However, it is well known that the capacity of those plants currently operating on coal benzol is, or soon will be, far beyond published figures. So, even without the California plant operating on petroleum benzol or the closed Institute plant, a total capacity of 200,000 tons of styrene monomer in the United States is well within reason. That amount of styrene would consume 70,000,000 gal. of pure benzol, although this pure benzol figure might vary in view of the reports that Kopper's Kobuta styrene plant can use motor grade benzol for processing into styrene.

Polystyrene versus synthetic rubber

The styrene used in the synthetic rubber program accounts for a considerable portion of the benzol production. Over 600,000 tons of butadiene-styrene or GR-S rubber were produced in 1946, a production requiring about 150,000 tons of styrene monomer. It is generally understood that 350 gal. of benzol are required for one ton of styrene which means that roughly 52,000,000 gal. of benzol were used for GR-S in 1946.

The amount of benzol required for styrene monomer for both GR-S and polystyrene plastics in 1946 was:

MATERIAL	MATERIAL TONNAGE	STYRENE TONNAGE
GR-S	600,000	150,000
Polystyrene	33,500	33,500
Total styrene		183,500

TOTAL BENZOL NEEDED.....64,225,000 GAL.

The total styrene requirements of GR-S and polystyrene—183,500 tons—come close to equaling Tariff Commission's estimated production figure of 185,000 tons of styrene monomer in 1946. If polystyrene molding powder reaches the production goal of 150,000,000 lb. or 75,000 tons in 1947, that application alone will require over 25,000,000 gal. of benzol.

It is obvious that polystyrene and GR-S rubber production are closely linked and that as long as 500,000 or 600,000 tons of GR-S rubber are produced there will be little chance of expanding polystyrene production beyond present planned production which is thought to be around 250,000,000 lb. annually, the goal for 1948.

Figures in the above chart indicate amounts of benzol that would be needed under varying conditions. They are based upon these assumptions:

a) 1 lb. of polystyrene requires slightly more than 1 lb. of styrene monomer.

b) GR-S synthetic rubber contains about 25 percent styrene and 75 percent butadiene. Since the figure for converting benzol to styrene is 350 gal. of benzol to one ton of styrene, 100,000 long tons of synthetic rubber require 8,750,000 gal. of benzol.

Of course it would be possible to build additional styrene monomer plants but with present facilities thought to be capable of digesting over 70,000,000 gal. of benzol, producers will look sharply before they take a gamble on whether or not enough benzol will be available in the future.

SYNTHETIC RUBBER

The availability of styrene for plastic materials, to say nothing of its use in paints, insulation and other purposes, is conditioned upon the amount used for rubber. The synthetic rubber situation is one of this nation's greatest potential political footballs. The farm-bloc may jump at it gleefully when they see a possibility of turning surplus crops into alcohol for conversion to butadiene and the tariff politicians will undoubtedly make capital out of rubber in some way in years to come. Military men have stated that our synthetic rubber plants are as much a part of defense as the Army and Navy. In addition, synthetic rubber is capable of improvement to a state where it will do al-

most anything as well as will natural rubber and thus obviate the necessity for extremely large quantities of natural rubber.

With all these factors to consider and with the knowledge of the Batt Interagency Committee's recommendation that at least 250,000 tons of synthetic rubber production be kept in operation with 250,000 tons of additional capacity held in stand-by condition it is apparent that the market for benzol in synthetic rubber production is going to be of considerable size for some years to come. It is possible that butadiene-styrene rubber production might be abandoned in the distant future for some other type of synthetic rubber. But under present circumstances that day is not forseeable. At present, there seems to be a majority feeling that synthetic rubber production should be held down to 250,000 tons starting in 1948, but many authorities believe that actual synthetic rubber production in the United States will eventually stabilize in the neighborhood of 500,000 long tons—regardless of the price of natural rubber in Singapore.

BENZOL FOR PHENOL

What amount of benzol then is left for the phenolic plastics? A good sized chunk to be sure, but phenol has many uses. During the war years, for example, over 10 percent of benzol production disappeared into phenol vats.

Annual production of phenol since 1943 has been running close to or slightly over 200,000,000 pounds. The 1946 figure is estimated at between 190,000,000 and 195,000,000 lb. according to monthly Tariff Commission reports. About 14 percent or 32,000,000 lb. was natural phenol obtained from coal tar without going through the benzol process. The 14 percent is, incidentally, a little high for recent years when natural phenol was nearer 10 percent of the total. The amount of benzol required for the approximately 160,000,000 lb. of synthetic phenol produced in 1946 (figured at a conversion factor of 7.15 lb. per gallon of benzol) was roughly 23,000,000 gallons.

It is interesting to speculate on these phenol and benzol figures. The phenolics for all purposes except protective coatings added up to a poundage of 240,000,000 in 1946, but 70,000,000 lb. of this amount was filler used in molding powder—thus leaving 170,000,000 lb. of dry resin. If the phenolic resin industry, exclusive of protective coatings, should expand in volume by 33 percent to reach 225,000,000 lb. [figuring that phenol and formaldehyde (commercial 37 percent) are about 50–50 in its make-up] the amount of phenol required for the total would be 225,000,000 pounds. This sum at 7.15 lb. of phenol per gal. of benzol would require 32,000,000 gal. of benzol.

Actually a pound each of formaldehyde and phenol yields slightly more than 1.05 lb. of resin after the water has been driven out. But for practical purposes the practice is to figure 2 lb. of material for one pound of resin.

There is some natural phenol and quantities of meta para cresol used in phenolic resins but authorities assert that at least 65 percent of all so-called phenolic resins use synthetic phenol. Therefore we figure that 65 percent or about 146,000,000 lb. of synthetic phenol would be required. This amount would require about 20,000,000 gal. of benzol.

If phenolic plastics, exclusive of protective coatings expand 33 percent over present production, amount of materials (figured in millions) would look like this in table form:

Dry resin produced	Phenol required	Formaldehyde required	Benzol required
	(millions of pounds)		
225 lb.	225 lb.	225 lb.	20 gals.

There is not room in this article to write about other possibilities for phenol than plastics. However, in most other fields its use should increase rather than decrease so there is little possibility of a declining need for benzol in phenolics.

End uses of benzol

We thus far have mentioned three outlets for benzol in the near future which are broken down in the table at the bottom of this column.

The figures in this Table need a bit of interpretation. It is anticipated that steel production may be up 30 percent in 1947 and benzol for chemical synthesis may be increased to 150,000,000 gal. (a figure which does not include the motor grade) from the resultant increase in coke production, but few authorities expect pure benzol from coal ever to go much over 150,000,000 gal. again. Something like 20,000,000 gal. could be used

End uses	Benzol (gal.)
Synthetic Rubber (500,000 tons)	
350 gal. of benzol per ton for 125,000 tons of styrene	44,000,000
Polystyrene—Prospective	
125,000 tons in 1948 requiring slightly more than 125,000 tons of monomer	44,000,000
Phenolic Resins—Prospective	
33 percent increase over present production exclusive of protective coatings	20,000,000[a]
Total	108,000,000
1946 Benzol Production	
(estimate including 40,000,000 gal. of motor grade)	175,000,000

[a] 65 percent from benzol—balance natural phenol and meta para cresylic.

by the dye industry; another 20,000,000 gal. could be used in the miscellaneous group including nylon, detergents, D.D.T., maleic anhydride, camphor and other items named before.

Despite the apparent future needs there is still doubt as to where a new supply of low-cost benzol may be found when needed. It is believed that a considerably larger quantity could be obtained at a slightly higher price by scrubbing out coal gas more thoroughly and further refining the better grades of motor benzol for recovery of chemical grade benzol. Benzol was a most critical item during the war and a necessary preparedness commodity but, unlike rubber which depended upon it, little publicity has attended its importance. Nevertheless, there is still hesitation to delve into new methods for its manufacture for, as any reader can see from the foregoing article, its future depends upon synthetic rubber and plastics—new industries whose futures are not yet clearly discernible.

BENZOL SOURCES

Two other sources are readily available from which benzol can be obtained. They are petroleum and natural gas. Authorities say that it can be obtained at the same time as toluene when the latter is cracked out of petroleum. Toluene was obtained in great quantity from petroleum during the war but it was not seen fit to take out the benzol at that time. So far there has been no enthusiasm shown by the oil companies for development of benzol production but it is believed that experimental work has been carried on to such an extent that production could be undertaken within a reasonably short time if the oil companies were assured that there would be a permanent future market at a price somewhat higher than that prevailing at present.

Little is known about the development of the natural gas process for obtaining benzol or phenol. However, it might not be a bad gamble to wager that when coal-processed benzol falls too far short of filling demand natural gas may become the provider rather than petroleum. A tempering circumstance is that natural gas is said to be approaching exhaustion within a few decades in the West Virginia area while the Texas fields can not go on forever.

Substitutes for benzol

There is, always, the possibility that producers will find other source materials to use in place of or to supplement benzol. It is reported, for example, that nylon can now be made from petroleum chemicals and perhaps other materials. Furfural from oat hulls and corn cobs is another material that may find more frequent use in plastic materials as a replacement for some of the chemicals that are at present in short supply. Finally, work on extenders may develop to a point where much less phenol is required. Most companies have been furnishing extended phenolic compounds over the past few months to conserve their phenol supply, and it is possible that this practice will continue indefinitely with the extended resins possibly selling at a lower price when times become normal.

CRESYLIC ACID

Cresylic acid and cresol (other coal chemicals mentioned here) are desirable for laminating varnishes, tricresyl phosphate plasticizers, ore flotation, disinfectants, textile treatment, medicinals, dyes and inks. As a carbon remover from automotive and aviation engines cresol was indispensable in wartime; for similar use in civilian applications it is highly effective. As an oil refining agent it has unusual properties. One producer claims that a mixture has been developed using cresylic and other materials which would make it unnecessary to change the oil in an automotive universal joint during the life of a car. However, the amount needed for this automotive use would be so great that the idea has been abandoned—there simply is not enough of the cresylic available.

There simply is not enough—not even to provide the amounts needed today, to say nothing of an expanded plastics industry in the future. As with both benzol and naphthalene, cresylic acid can and is being made from petroleum but it takes larger quantities of petroleum to obtain smaller amounts of these chemicals and not all types of petroleum contain the necessary properties.

NAPTHALENE

A shortage of napthalene from coal tar is another scarcity which has plagued the plastics industry to such an extent that one company has already turned to producing ortho-xylol from petroleum and others are planning to build new plants for conversion of ortho-xylol into phthalic anhydride, the material from which plasticizers are obtained.

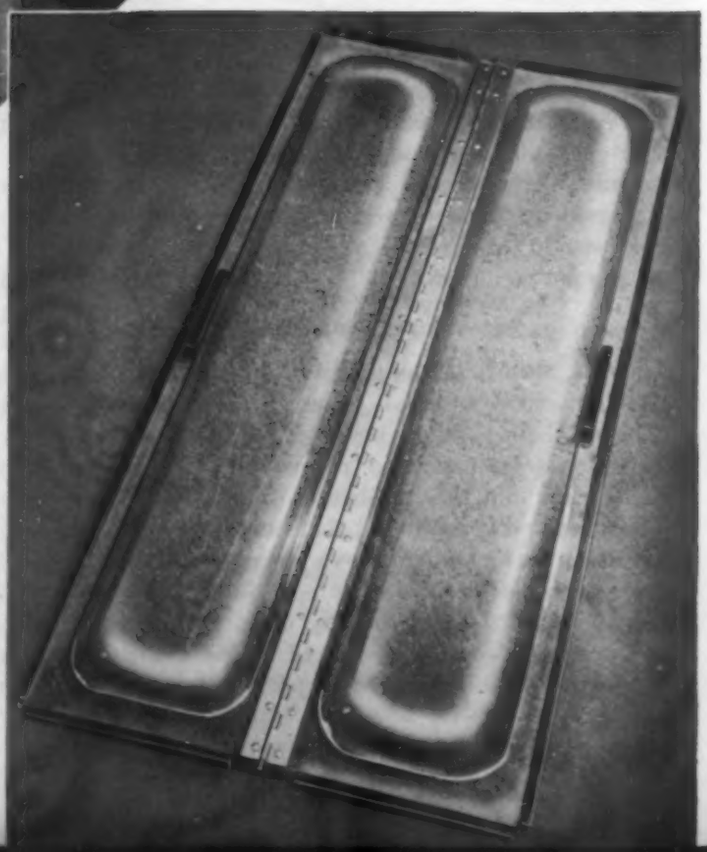
Napthalene is needed for phthalic anhydride, dyes, moth repellants, insectifuges, for oil treating, chemical manufacture, and for wetting and tanning agents. The current struggles to obtain phthalic anhydride between those who want to use it for alkyd resins in paint and those who want it for plasticizer in vinyl resins could easily develop into a highly interesting industrial brawl with the spectators mightily concerned in the potential winner.

Napthalene comes from coal tar in the same stream with natural phenol, cresols, cresylic acid, creosote oil and pitch. Production of naphthalene has increased from 100,000,000 lb. in the prewar years to over 250,000,000 lb. in the war years with an estimated 255,000,000 lb. of salable grades in 1946. Of this amount, about 100,000,000 lb. of the highest grade is not used for phthalic anhydride because it brings more money when used for moth (*Please turn to page 198*)

DRAWN ACRYLIC lid

Strength sufficient to support loaded shopping bag, non-fogging properties, dimensional stability, resistance to abuse, easy maintenance, a low price, easy packing, standardization are some advantages of acrylic for deep freezer lids





1 (above)—*In tests run on the sales stimulating effect of methyl methacrylate lids on deep freeze units in food stores, cabinets with these covers outsold cabinets with lids removed by two to one*

2 (right)—*Weighing but 10 lb. 7 oz., these transparent covers were designed so that one piece serves a single compartment deep freeze unit while two drawn lids, when hinged together, fit exactly over the double compartment units. Handles are made of blue methyl methacrylate*

on deep freeze unit

THE frequency with which women shoppers lift the transparent methyl methacrylate lid on the Biltwel frozen food cabinets, made by Fraser & Johnston Mfg. Co., San Francisco, Calif., and reach in for boxes of frozen peas, strawberries, corn, is certain testimony to the sales-promoting eye appeal of these lids.

But the full story of the suitability of Lucite to this application is known only to the cabinet manufacturer and the management of the food stores using the units. Aside from transparency, there were nine operational and production conditions that had to be met by the methyl methacrylate before it was adopted for this particular use. They were:

1. Non-fogging.
2. Strength sufficient to support the weight of loaded shopping bags which customers might rest on the top of the lid.
3. Resistance to abuse.
4. Dimensional stability.
5. Easy maintenance.
6. A low price.
7. Ability to be packaged easily for shipment.
8. Ability to be identified as an integral part of the cabinet itself.
9. Standardization in size so that lids could be fitted to both double and single compartment cabinets.

K-Plastix of San Francisco, Calif., met all these conditions in fabricating a longitudinally-hinged winged lid of methyl methacrylate. The use of standard materials and standard equipment was decided upon so that the tools could be converted immediately, and without substantial loss, to the manufacture of other products upon completion of the contract. Processes were geared to the level of semi-skilled labor and the methods employed in assembly were such as to keep handling at a minimum yet be flexible enough to meet the client's progressive daily requirements.

Like the lids, the handles of the deep freeze covers are of Lucite. But in this instance rich blue methyl methacrylate is used, rather than the transparent material, to make them stand out as well as add an attractive color note.

How the conditions were solved

1. *Non-fogging*—This problem was never entirely solved—even $^{5}/_{8}$ in. material shows some fogging on humid days. However, the fabricators discovered that domed lids fog mostly around the outer flat rims, the domes themselves remaining clear. Subsequent experience has shown that one wiping of the cover in the morning will keep the methyl methacrylate clear for an average shopping day.

2. *Strength*—Doming of the lid by drawing, as shown in Figs. 3 and 4, proved the solution to the strength problem. By actual test, a lid drawn from $^{3}/_{16}$ in. Lucite was found to support a shopping bag

3 and 4—*The method of forming employed for these covers keeps labor costs low. It is of interest that the long sides of the rims are designed with a slight upward curve—a precaution against sagging due to cold flow in the material*

ALL PHOTOS, COURTESY K-PLASTIX





filled with a little over 10 lb. of miscellaneous groceries, even when this weight was placed at the very center of the lid, the weakest place in the piece. The sag was only 1/8 inch. However, as finally approved for production, the specifications called for 1/4 in. sheeting as an extra insurance against breakage. Additional strength also accounts for the reinforcement of the aluminum hinges on the underside with L-shaped metal strips. One interesting design note is that the long sides of the rims are curved slightly upward in the middle—a precaution against any sagging which might eventually develop due to cold-flow of the thermoplastic material.

3. *Resistance to abuse*—Rubber channeling around the edge of the methyl methacrylate lid and contact riveting to reduce the development of internal stresses in the material explain in large part the no-breakage record that has been run up thus far by the 1000 lids in actual service. Only one handle has been broken off, and that by violence.

4. *Dimensional stability*—As the domed construction of the lid reduces fogging so it accounts for the good dimensional stability of the part. Production men at K-Plastix felt that a flat sheet of Lucite would warp in an application like this where there is a variation of temperature of from 40 to 80 degrees between the inside and the outside of the cabinet. The domed shape was found to absorb warpage and to keep the contact edges straight.

5. *Easy maintenance*—The nature of the plastic proved a guarantee of easy maintenance—a daily wiping with a soft cloth being all that was required. However, the streamlined design has added its bit to the simplification of even this simple task.

6. *Low price*—From the inception of the design of the lid, the need of conserving material, and thus reducing costs, was kept in mind. Production methods which, as mentioned previously, make possible the use of semi-skilled labor and a minimum of assembly work, have also contributed to a low cost per lid which has made it possible for Fraser & Johnston Manufacturing Co. to keep the cabinet with its Lucite lid in the price bracket of similar boxes without lids.

7. *Ease of packaging*—During the period of engineering development it was found that, with handles shaped as in the final product, the lids could be inverted and placed over the cabinet for shipment without need of extra padding. The handles and the end spindles act as buffers. Two strips of tape to hold the lid securely in place are all that is required.

8. *Identification mark*—The incorporation of an identification mark as an integral part of the lid was, perhaps, the easiest condition for the acrylic to meet. The name "Biltwel" is embossed in the material during the drawing process.

9. *Standardization of size*—This problem would have been solved in the same way, no matter what material had been used in the lid. By a slight readjustment in the construction of the cabinets, the manufacturer found that it could use one lid on the single compartment units and two lids, of the same size and placed side by side, on the double compartment units.

The light weight of the lids—only 10 lb. 7 oz.—was at first considered a most important advantage. The idea was that food store managers might want to remove the lids during rush hours, an operation where weight would be important. However, by sales count, the cabinets with the lids consistently outsell by two to one the cabinets with the lids removed.



JUNGLE GYM, AN ALL-PLASTIC TOY, brings amusement within baby's reach. Frederick Allen Williams, animal sculptor, turned out design for Plastic Treasures, Inc., New York City.

Two giraffes form the blanket clip supports while a pot bellied ludicrious monkey swings on an elastic cord, holding a plastic teething ring. Giraffes, monkey and ring are molded of Tenite I in a 3-cavity mold by Boonton Molding Co., Boonton, N. J.

Tooling on the mold had to be exceptionally fine to assure that the comical expression given the monkey and giraffes would be reproduced perfectly. The mold parting line on the flat animals also had to be carefully tooled so no sharp edges would result and detract from the complete safety of the toy.

The pastel pink and blue urea balls strung on the cord are a stock product molded by Synthetic Plastics Corp., New York City.



Left—Position of plates and holding pins which serve as guides for work table is shown. Although this planer table has been in continuous service for over two years there is no sign of wear on plates, pins



Right—Correct placement of the pins and plates at right angles is essential for long wearing qualities

Heavy duty for high-pressure laminates

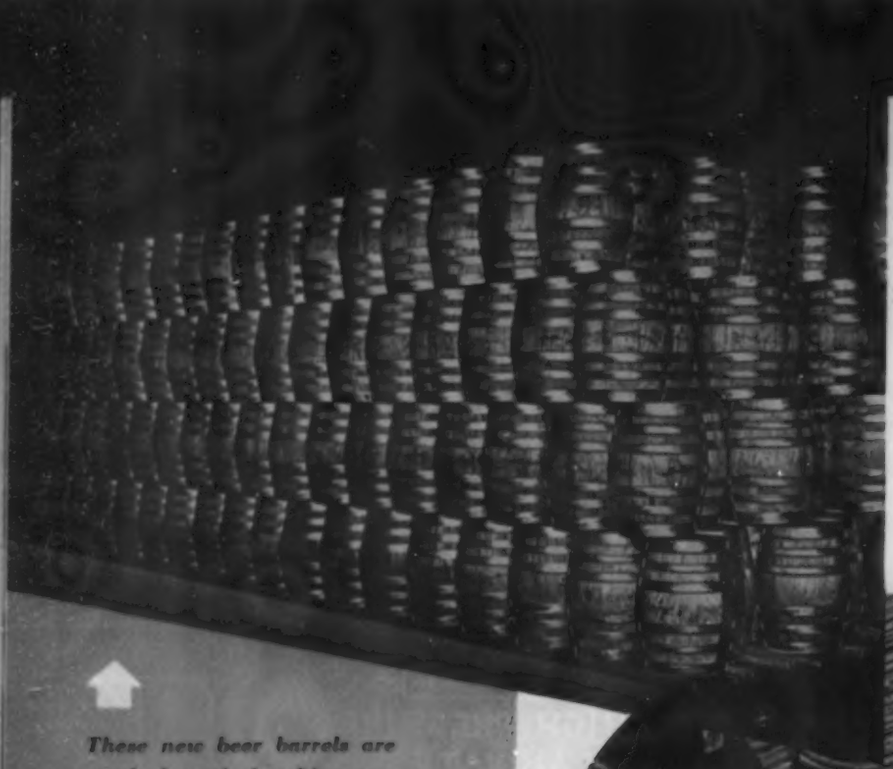
Plates and holding pins on table ways of heavy duty planers now are made of high-pressure laminates

NON-SCORING, wear-resistant and heat-insulating qualities explain the use of Formica plates and holding pins for table ways in the Gray Co., Cincinnati, Ohio, heavy-duty planers. The picture above shows position of the plates and pins which act as guides for the work table. The sketch indicates the way in which the laminations of the plates and the pins are placed at right angles—a positioning which both experience and theoretical considerations have indicated to be of importance from the point of view of wear.

The planers that use Formica in this way are designed for heavy-duty work. Consequently the bearing surfaces are under heavy pressure as the table with its work load moves back and forth under the planing head. The reciprocating action plus the weight develops a considerable amount of heat. Should this heat at the V-shaped bearing surfaces be transmitted to the lower plate of the box-section table, this plate would expand and curl up at the end. And any such curling not only would destroy the accuracy of the planer work but would permit dirt to get under the table vees and increase the danger of these vees being cut and scored. Both these possible sources of trouble are eliminated when high-pressure laminates are used for the plates and pins of the table ways due to the excellent heat insulating qualities of the material. Incidentally, the value of insulation in the material used for these guiding surfaces has increased as the speeds of the planer table have been stepped up. Today many of these units are running at a rate of 300 ft. a minute. Using Formica ways the tables may be operated at any feasible speed without danger of the table curling.

The wearing qualities of the high-pressure laminate in this application can be seen from the illustration at the top of the page which shows a planer table that has been in continuous service day and night for over two years. This planer is used for the heaviest work and the normal return speed is 380 ft. per min., yet there is no evidence of wear on the laminated plates and pins.

High-pressure laminates have been used for years by the Navy for stern bearings. They are used for roll neck bearings in steel mills. Now there has been a further extension of the use of these laminates in a field that requires wear resistance of a high order.



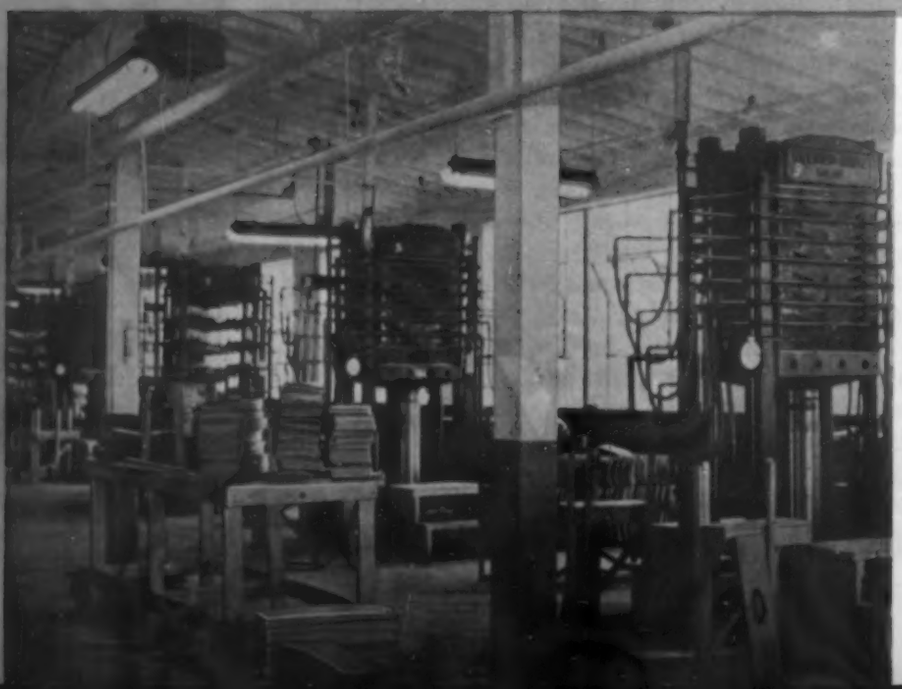
These new beer barrels are stacked, ready for shipment. Each is composed of 11 parts in contrast to conventional types using 22 to 29 parts

Nine oak or maple plies are bonded with phenolic resin to form each of the eleven parts comprising this sturdy, economical barrel



Basic ingredients of a barrel consist of unfinished head, left, and staves laminated from the strips of seasoned wood, background

Barrel head and staves



Laid-up assemblies of nine plies each for the head and staves are air dried, then placed in these presses and formed under heat, pressure

EVEN the centuries-old art of coopering—barrel building—has finally yielded to the trend of the times and turned to plastics. Veri Bros., barrel manufacturers of North Bergen, N. J., utilizing modern materials and methods are producing beer barrels which not only are simpler and more economical to manufacture and repair, but also withstand the terrific beating encountered in service better than those made by the conventional method. Head and stave blocks for the new barrels, instead of being shaped from solid pieces of wood, are laminated from nine thin plies bonded with a Durez phenolic resin adhesive. The Camfield Manufacturing Co. is responsible for the laminating of head and stave blocks.

Basically a barrel is simply an assembly of wooden staves held tightly together by a set of steel bands without recourse to nails or pegs. The staves are wider in the center than at the ends and are curved uniformly along both their length and width. Both ends of the staves are grooved to hold the round heads.

Conventional versus laminated barrel

In the conventional manufacturing method, a stave is shaped from a single piece of white oak—16 to 21 being required for each barrel. A head is fashioned from three or four pieces of oak. Thus, a total of from 22 to 29 pieces is required for a standard $15\frac{1}{2}$-gal. barrel. Variations in the direction of grain, the density and the moisture content of the wood are constant bugaboos.

Today, the Camfield Manufacturing Co. is producing laminated wood staves and heads which have excellent uniformity because of the close control that can be maintained over the variable factors. The laminated pieces consist of nine $\frac{5}{32}$-in. thick plies of well-seasoned oak and maple, bonded together with phenolic resin. Some of the veneers are cross-grained to give extra strength to the parts, being automatically placed in their proper sequence as they come from the glue spreader.

The laid-up assemblies of nine glue-coated wood plies are air-dried for a few hours, then placed in steel molds and formed under considerable heat and pressure. The pressure applied is somewhat above the 200 p.s.i. normally used for plywood. This higher pressure facilitates the shaping of the lay-up in the mold and gives added assurance of a positive bond. Twelve staves are pressed at one time in a multiple-bank press. Each stave is press-marked to simplify further finishing operations. The heads, which are built up from square veneers, are pressed in dies which give them a slightly curved surface.

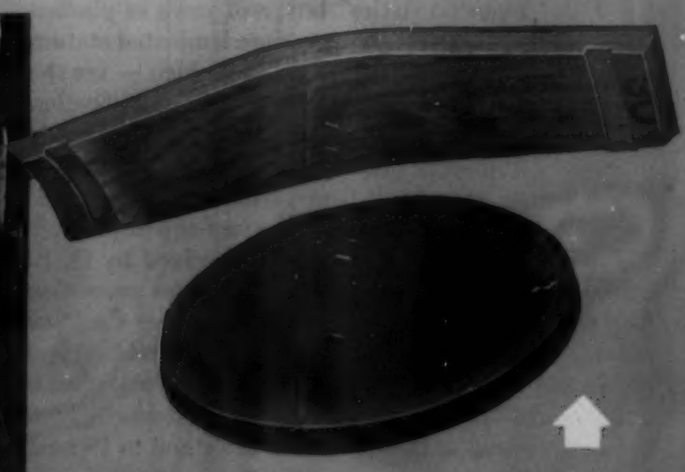
Because the laminated staves can be curved in wider arcs than those made from solid billets, only nine are required per barrel. The addition of the two one-piece heads makes a total of only 11 parts in the complete unit as against 22 to 29 in the conventional barrel. Assembly is greatly simplified by this reduction in parts, and the possibility of leakage is decreased 50 percent or more. Finishing work on the parts before final assembly, including rounding of the heads and beveling of the edges of the staves, is considerably reduced.

Six hoops are used to hold the barrel together. These are jammed on under a pressure of over seven tons. The bungs are then sealed and the finished barrel is subjected to an internal steam pressure of 40 p.s.i. This last operation quickly reveals any leaks and is a good indication of the barrel's ability to withstand the air and other pressures which it must be expected to encounter in the trade. A coat of pitch applied to the inside surface of the barrel keeps moisture from penetrating to the inside and prevents the beer from picking up any foreign odors.

ALL PHOTOS, COURTESY DUREZ PLASTICS & CHEMICALS, INC.

are bonded with PHENOLIC RESIN





The finished head and staves, such as are shown above, are held together with six hoops. Left—Hoop driver puts 7-ton pressure on binders which keep barrel moisture-tight. The bungs are then sealed

LAMINATES for Outdoor Displays

Polyester resin impregnated glass mat and cloth are used in molding tire display figures and stands



A familiar advertising display figure is now made of plastic. Capable of withstanding outdoor weather conditions, the 74 in.-high figure is low-pressure molded of glass mat impregnated with a polyester resin

ONE of the best known advertising characters, the Fisk "Time To Retire" boy, will yawn in plastics from now on. Two low-pressure laminated statues — one 34 in. high and the other 74 in. high — are the central elements in a whole new Fisk Tire identification program. The smaller sign, to hold an actual tire, is intended for display inside service stations or in the service court. The 74-in. figure, with a tire of the same material, is designed for exterior or roof-top displays.

The identification program was conceived by D. E. Detweiler, manager of advertising and sales promotion for the tire division of United States Rubber Co., and involves, besides these figures, coordinated architectural design for tire service stations, new color schemes, a Fisk "family" crest and the use of a new interior-lighted hemisphere map of the world as a tire stand to be used for display.

The two statues and the tire for the bigger statue are all low-pressure molded by Bassons Moulded Products of Bronx, N. Y. The base material is glass mat, flocked with glass and impregnated with Vibrin polyester resin. Both "time-to-retire" boys are produced in two-piece concrete molds using the molder's privately formulated parting compound. The large tire is made in three identical one-piece molds which produce $^1/_3$ of a tire at a time. Female molds are used throughout, all molding is done by blowing with low pressure under a rubber blanket covering.

Finishing and assembling

Assembly is accomplished by resin adhesives. Since the candle in the boy's hand has to be wired for lighting — a slash in the side of the candle stick being employed to illuminate the boy's face — Bassons decided to use the electrical conduit as an engineering device. The conduit is carried up along the inside contours of the figure, across the inside of the head and down to the feet where it is locked to the base with lock washers.

This $^3/_4$-in. conduit forms a good tie-down structure.

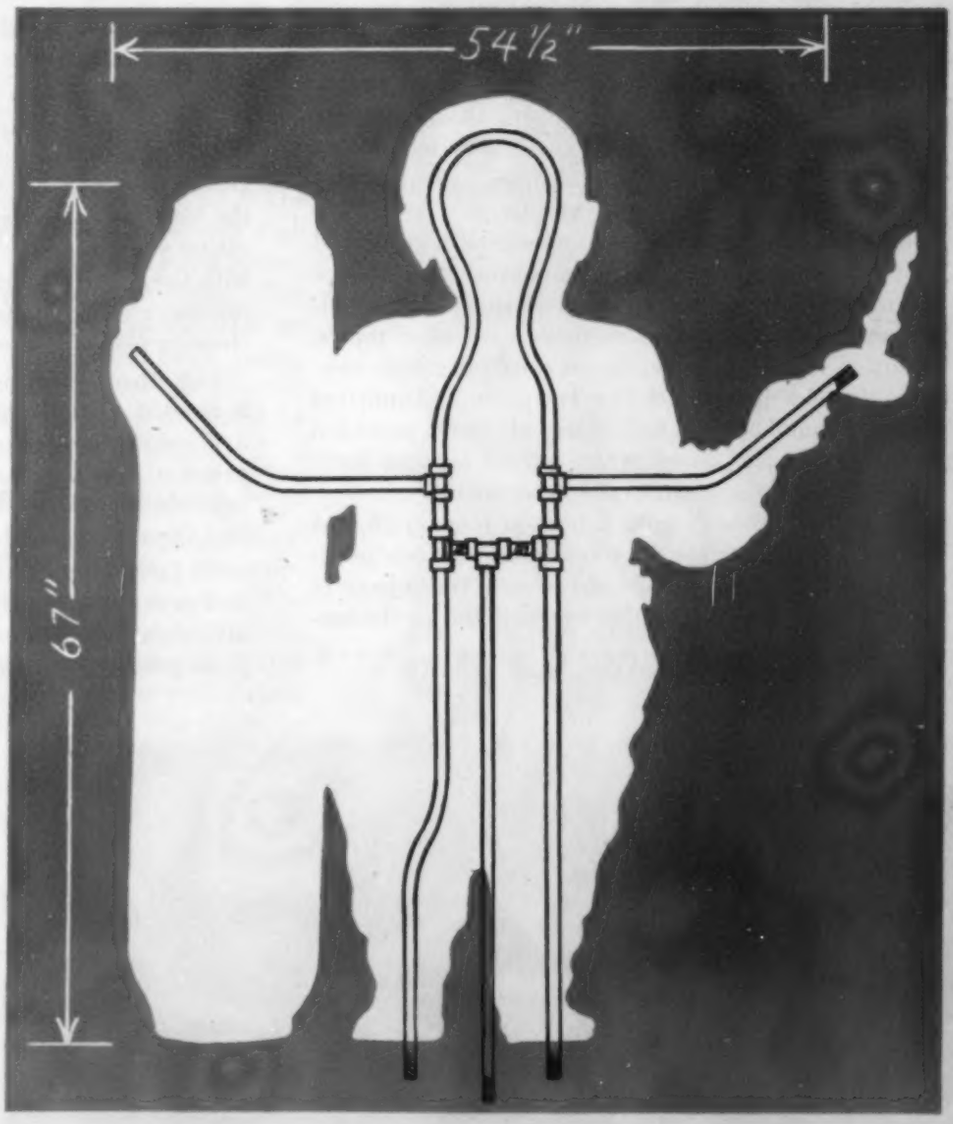
The boys' figures are finished with a pigmented chlorinated rubber formulated by United States Rubber Co. Under test, this surface has taken a whole year's exposure to the elements with no chipping, weathering or cracking. Those who may question the advisability of using such light weight materials as polyester impregnated fabrics for outdoor signs under high wind conditions, will be interested in the company's experience with these test units which indicate that the streamlining of the job permits the air current to flow around the statue, leaving it unstrained and firm.

Tire stand also uses plastics

The lighted hemispheric tire stand also features Vibron polyester resin, but it is made with glass fabric rather than mat. In this application the total lamination is $^1/_8$ in. thick. Like the statues, the stand is a rubber bag job, blown into aluminum molds and produced with a 12 min. cure. The molder estimates that he gets 50 pieces during the life of each bag which is made of a special rubber compound designed to stand up at 325° F. Since this tire stand is to be lighted from the inside, it is finished with transparent colored lacquers.

Here again we see how war-born techniques and materials can find their way into civilian applications through clever design and careful molding. In the case of advertising signs and display structures, there are elements other than the straight plastic application to be considered. The smaller statue, for example, is mounted in different ways in different locations — on a metal platform or on a swivel base for pole mounting. In the latter case, the figure is positioned so that the greatest amount of traffic sees it from its best known angle — the three-quarter profile view. The larger figure is generally mounted on a horizontal metal drum, on which the brand name appears in neon lights.

Shipping weight plus bulkiness of contour has always been a problem in transporting heavy metal three-dimensional display figures by rail or truck. The polyester laminated figures overcome the weight problem. Furthermore, when packed in engineered open crates, they have, to date, set a damage-free record in transport.



Since an electrical conduit was needed to light the candle held by the boy, it was decided to extend the structure through the body to serve as a tie-down piece. The conduit is thus used to anchor the display to a metal drum

Reviewing S.P.E.'s meeting and exhibit

A COMPREHENSIVE program of technical papers, covering a number of current developments in the field of plastics, highlighted the annual meeting of the Society of Plastics Engineers, Inc., held at the Congress Hotel, Chicago, on January 27 to 31.[1] Staged in conjunction with the meeting was the third annual S.P.E. plastics show, held in the drill hall at Chicago's Navy Pier.

More than 700 persons registered for the technical sessions, including 412 S.P.E. members. Attendance at the individual technical sessions ranged from 75 to 175. Technical programs were held each morning during the week, with afternoons and evenings left open in order to give S.P.E. members an opportunity to inspect the exhibits and exchange views on industry developments with raw material suppliers, equipment manufacturers and other representatives.

The excellent technical program stirred a great deal of discussion on low-pressure laminating, the relative merits of different methods of preheating plastic molding materials, fabricating methods and other topics. Many of the speakers illustrated their talks with samples of molded, fabricated or low-pressure laminated items. A number of the talks were followed by extended discussion periods during which points brought forth by the speaker were covered in greater detail.

The S.P.E. annual banquet, held on January 28, was attended by approximately 400 persons. As new president of S.P.E., Mr. Orr outlined some of the objectives toward which the organization will work during the current year. After the introduction of new officers and directors, the principal speaker of the evening, Vice Admiral E. L. Cochrane, Chief, Materials Division, Office of Assistant Secretary of the Navy, spoke on the need for continued preparedness. The admiral's address was followed by a floor show.

[1] Digests of all these speeches were presented in the article entitled "S.P.E. annual technical meeting." MODERN PLASTICS 24, 121–124 (Feb. 1947).

NEW NATIONAL OFFICERS

T. E. Orr, Plastic Engineering, Inc., was named president of the S.P.E. at the Chicago conference and succeeds George W. Clark of Toledo. Other new S.P.E. officers for 1947 include J. H. DuBois, Shaw Insulator Co., vice-president; T. E. Richards, Midwest Molding & Mfg. Co., secretary and P. R. Marvin, Milwaukee Gas Specialty Co., treasurer. Newly elected directors are: R. G. Chollar, National Cash Register Co.; R. B. Bishop, Vacuum Oil Co.; P. F. Corbin, Textileather Corp.; R. G. Dailey, Standard Products Co.; E. A. Russell, Spaulding Fibre Co.; M. Petretti, Noma Electric Co. and W. J. Dunnican, Durite Plastics.

Plastics exhibit

Unfavorable weather cut attendance at the exhibit which opened two days prior to the technical program. The exhibit included about 50 commercial displays, movies on various phases of industry operations and a style show.

A BT-13 military aircraft fuselage section from Wright Field was displayed as a special exhibit at the show. It was constructed of glass cloth laminate and low-pressure resins. Another special exhibit, staged by the Veterans Administration, showed the plastic fabricating work done by injured personnel in connection with the Army's rehabilitation program. Also of wide interest was a U. S. Army Medical Department exhibit showing plastic eyes and other prosthetic items.

The other exhibits included a wide variety of molded, laminated and fabricated products having both home and industrial applications; demonstrations of compression and injection molding, high-frequency preheating, thermoplastic sheet forming, mold making and the drying and heating of thermoplastics.

To facilitate exchange of information, from 1 p. m. to 4 p. m. each day was set aside at the exhibit for the attendance of industry persons only. From 4 to 10 p. m. general public was permitted to attend for $1.00.



Vice Admiral E. L. Cochrane congratulates Thomas E. Orr, new national president of S.P.E. Others, left to right, are: J. O. Reinecke, meeting chairman; T. E. Richards, new secretary and J. H. DuBois, newly elected vice-president



Ornaments can be quickly made of cold-pour plastic



Doll looks like one made of cast plaster

A COLD-POUR plastic material

by J. F. T. BERLINER*



Sharpness of lines are well achieved here

A LOW-COST cold-pour plastic, using the same techniques, equipment, molds and skills that are used for the casting of plaster, has been brought on the market very recently by the Palestic Corp. of Chicago, Ill. The product is resistant to chipping and breakage, has high tensile and compressive strengths and low water absorption. From it both solid and hollow casts can be made. The principal items now being produced from this material are figurines, novelties, fancy dress buttons, lamp bases, pedestals, wall brackets, sconces, plaques, mirror and picture frames, book ends, desk pen bases, packages for toiletries and perfumes, and advertising and display articles.



This horse head shows fine sharp detail

The components and their combination

Called Palestic,[1] the material is formed by adding gypsum plasters to a water solution of resin forming chemicals. The chemicals are furnished as two separate liquids. The syrup, a colorless liquid, is a highly stabilized, partially polymerized urea-formaldehyde resin which may be well diluted with water without precipitation. It can be polymerized or set simultaneously with calcined gypsum. The factor, or catalyst, is a lemon yellow liquid although a colorless catalytic is also available for special purposes.

Any type of art or statuary plaster, industrial white plaster, or plaster of Paris may be employed. Special plasters such as the steam dehydrated alkaline plasters, and plasters containing special additives should be avoided.

In making up a formulation, the two liquids are stirred together in water, then the plaster is added. The plaster is allowed to soak up the liquid, then is stirred to a creamy consistency. Prior to setting, the consistency of the freshly



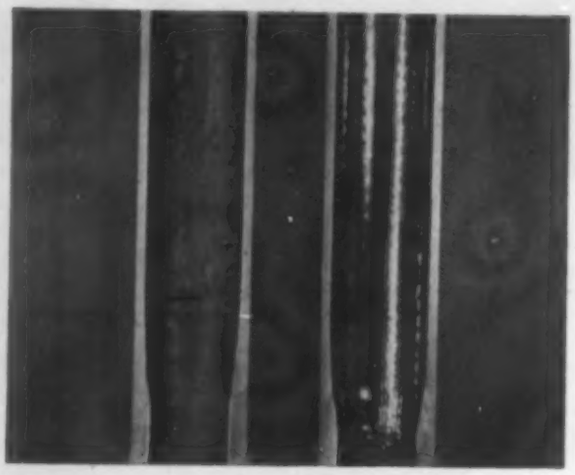
Although delicate, pieces resist breakage

* Consultant, Chicago, Ill.

[1] Trade mark, registered U. S. Patent Office.

A STEEL PIPE FOR DRILLING OIL wells, with a thermosetting plastic coating on the inside to prevent corrosion of the metal and subsequent failure in drilling, is being produced by Spang-Chalfant Div., National Supply Co., Pittsburgh, Pa.

In oil well drilling, it has been customary to rotate a length of pipe deep into the ground to locate a well. As the pipe encounters the thick salt beds in the earth, the drilling mud dissolves some of the salt and creates a strong corrosive solution which pits the pipe. Cracks soon develop from the pits, the pipes break and an expensive job of fishing up broken pipes and drilling equipment must be undertaken.



In developing plastic coated pipes, the problem lay in finding a material that could take the necessary punishment and one that could be applied to 30-ft. lengths of pipe. In addition, the coating had to be impervious to oil and water, be resistant to chemical attack, able to withstand temperatures as high as 400° F. and to stand abrasion without flaking off.

In applying the coating to the $4^1/_4$-in. diameter pipe that is shot-blasted on the inside, the liquid is forced up the inside until it reaches the top. Then it is drained down slowly so that no air bells or streaks are formed. After a normal-temperature short drying time the pipe is placed in an oven and the coating is baked. This process is repeated for four coatings.

The piping will soon be produced in quantity and the company expects to develop a similar piping for homes and industrial construction.

mixed ingredients is that of a moderately heavy cream.

The proportions of plaster, water, syrup and factor for most purposes are as follows:

Plaster	100 lb.	12.5 lb.	1000 gm.
Syrup	5 gal.	5 pt.	415 cc.
Water	4 gal.	4 pt.	335 cc.
Factor	6 pt.	12 oz.	63 cc.

The chemicals form a hard, insoluble, tough, stable plastic simultaneously and in combination with the hydration or setting of the plaster, the reaction taking place within 10 to 25 min., depending on the plaster, degree of stirring, temperature and other factors. Application of heat or pressure is unnecessary.

After removal from the mold (an operation in which the Palestic item is less subject to breakage than a plaster part) the item is partly dried in the air, then placed in an oven at a temperature not to exceed 150° F. For prolonged drying, as in the case of large pieces, temperatures below 130° F. are preferred.

The same types of molds can be used with Palestic as are used with plaster. Since very little heat is generated on setting, glue or gelatine molds may be employed. For the best work and for quantity production, flexible vinyl resin mold materials are favored.

Color and finish

The dried Palestic can be polished, sanded and drilled with tools used for metals. Its surface is relatively non-porous so that painted or lacquered finishes cover a greater area than when applied to plaster.

The color, if desired, can be added to the solution in the form of dye or mixed into the plaster in the form of pigment. The use of a dye is preferable. Usually 1 to 3 oz. of dye per 100 lb. of plaster is sufficient for bright medium depth shades. Dyes of the water soluble acid aniline type are most suitable, such as tartrazine (yellow), croceine scarlet (red), blue black SX (blue), nigrosine WS (black or grey) and light green SF.

Physical properties and cost

This cold-pour plastic has excellent resistance to abrasion and good physical properties. The tensile strength is about 1100 p.s.i. and the compressive strength about 12,000 p.s.i. For comparative purposes, it may be pointed out that for the normal good grade of plaster the tensile strengths vary from 200 to 250 p.s.i. while compressive strengths are around 2000 p.s.i. Palestic expands slightly on setting. Its average density is 85.5 lb. per cu. ft. The specific gravity is 1.377 at 20° C.

The cost of the material will, of course, vary with the scale of operation and the price of the plaster used. Assuming a plaster cost of $24 per ton and a production of about 150 lb. of material per day, the material's cost will be approximately 10 cents per pound. Larger scale production naturally results in a lowering of the material's cost.

Britain develops a new structural plastic

IN THE expanding field of laminates for light structural use, chemical and engineering research has been directed toward improvement of such characteristics as rigidity, dimensional stability, impact strength and strength-weight ratio. An advance in these as well as thermal and acoustical properties has been achieved by the British firm of Holoplast, Ltd., New Hythe, Kent, England, with the development of Holoplast, a new laminated board. In effect the material consists of surface sheets of either paper base laminated stock or actual wood veneer bonded and supported by a series of impregnated paper "girders" at 2-in. intervals. With a densified wood edge to facilitate fixing and joining of the finished product, these elements are bound by a new process of manufacture into a sturdy homogeneous board. The material was developed originally during the war when it was used extensively in the shipbuilding and aircraft industries. Civilian requirements have since broadened the applications, particularly in the vast construction field.

Phenolic resin impregnated paper

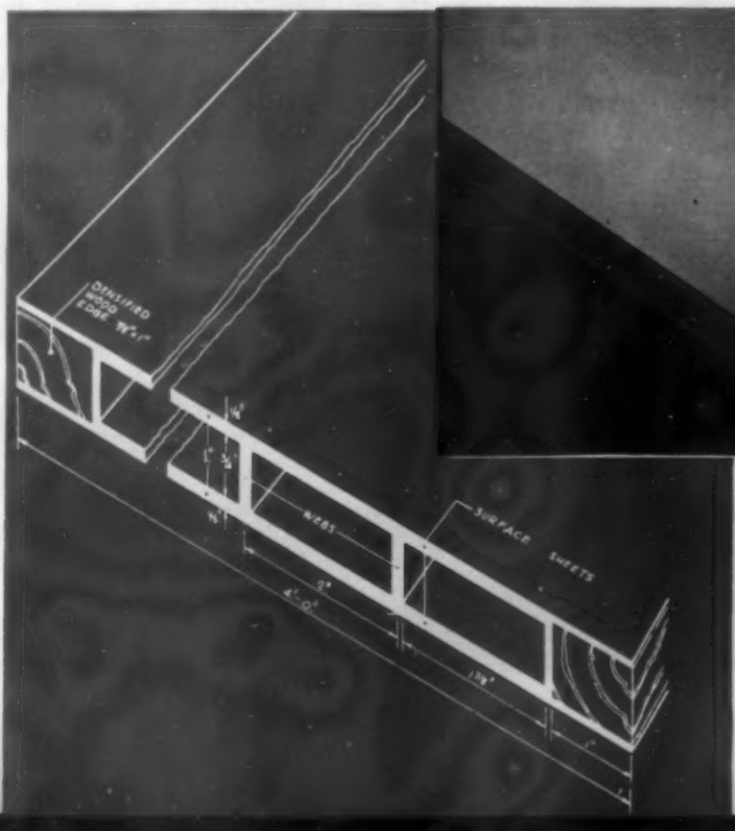
Special quality Kraft paper impregnated with a phenolic resin is the basic material. The paper is received direct from the mill where it is impregnated in two forms: sheets and coiled strips. At the Holoplast plant, the first operation is the production of continuous spiral wound tubes of circular cross section. A special machine is used and temperature is just sufficient to cause the resin to be tacky, temporarily fixing the spiral edge-to-edge winding so that the tubes may be handled in advance of the final cure. An automatic offset in the winding insures that no seam is directly in line with that of the adjacent winding, thereby providing maximum strength in the finished tube.

The tubes are cut to a predetermined length, cold-rolled to a rectangular cross section, and stacked to await assembly of the final board.

Surface sheets

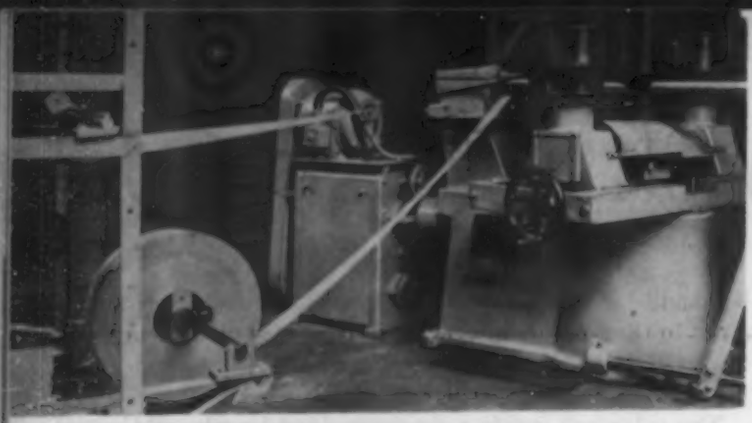
The under surface laminates in sheet form are arranged on a metal caul and over the sheets the rectangular section tubes are placed side by side the full width of the board. Then the densified wood edge members are positioned. The assembly is placed on a roller conveyor and split steel mandrels are inserted in the tubes to prevent their collapse under pressure. Finally the upper surface laminates are placed in position under the top caul. The board, now ready for the press, complete with mandrels, weighs more than a ton and the need for the roller conveyor is obvious.

A six-daylight hydraulic press, fitted with side rams essential for this operation and capable of 3500 tons pressure, is the central item of plant equipment. Platens accommodate six standard boards 4 by 8 ft. and the conveyor system is planned to permit delivery of six boards at a time to a hydraulic platform charger. The press empties the boards to a similar platform discharger where they are picked up immediately by the conveyor system. Cleaned of excess resin, the cured boards enter a hydraulically-operated extractor which withdraws the mandrels from the cavities in the board;





An example of the new laminated board which consists of surface sheets of either paper base laminated stock or wood veneer bonded and supported by a series of impregnated paper "girders." Diagram, left



Here resin impregnated coiled strips are being made into spiral wound tubes. Automatic offset in winding keeps the seams from lining up directly with previous winding



After tubes are cut to a predetermined length, they are cold rolled to form a rectangular shape. They are then stacked to await assembly of the final board

Rectangular shaped tubes are placed on laminated sheet and split steel mandrels are inserted in tubes to prevent collapse under pressure. Top sheet is then applied

the tensile load imposed on the board during this operation is very considerable, much greater in fact than the board is likely to be subjected to in service. In effect, therefore, each board is automatically tested in the manufacturing process. The final step is trimming.

The resultant board comes in two standard sizes, one 8 ft. 6 in. and one 8 ft. in length. Both are 4 ft. wide, 1 in. thick with web and flange thicknesses of $^1/_8$ inch. Web centers are 2 in. apart; weight is about 2 p.s.i.

An important feature of this material is the ease with which it can be worked with standard tools. Ordinary metal working tools may be used for such operations as drilling, tapping, slotting, filing, planing and milling. The densified wood edges can be handled with normal woodworking equipment. For cutting, a hollow ground saw with 7 to 14 teeth per in. is recommended. The best cutting speed is 12 ft. per minute.

Modified products

In addition to the standard surface finish, certain refinements are available, chiefly through the application of wood veneers. Suitable processes exist and are used to reproduce attractive veneer patterns on the surfaces of paper base laminated stock, but the company feels that the use of actual veneers for these surfaces cannot be excelled. Where specified, therefore, Holoplast is supplied with an outer wood veneer of any desired species. The same material is used for both top and bottom surfaces to insure balanced construction and the wood is bonded as an integral part of the board in the manufacturing process described above. Other standard finishes include a smooth spray in any desired color, dried by banks of infrared lamps, and a rough cast spray which resembles plaster.

Where curved panels are needed for use in wall and ceiling construction in conjunction with the flat structural board, the company supplies conventional laminates in six thicknesses from $^1/_{32}$ to $^2/_8$ in. with matching surfaces. Since the structural board is frequently applied as a light, strong flooring, special embossed surfaced laminated paper base stock is supplied as a nonslip, hard-wearing floor covering.

The special values the structural board derives from



its great tensile strength and stiffness are its imperviousness to extremes of weather and its effectiveness as an insulator against both heat and sound. The lightness and form of the material have been added reasons for its popularity in England for a wide variety of applications. In the building industry, for example, the board has been used extensively for single and double partitions because ease of fabrication and simplicity of erection reduce labor costs to a minimum. The insulating properties of Holoplast are said to be matched in this application only by use of much heavier and bulkier materials. Architects interested in planning standardized construction recognize the suitability of this board for prefabrication. The 2 in.-module in the web centering allows boards to be cut in widths which are multiples of 2 in., permitting standardized overall dimensions for rooms and yet some dimensional elasticity in the layout of partitions, ceilings, cupboards and doors of each room unit. The cellular structure of the board makes it possible to run cables through the cavities, thus hiding the unsightly conduits and providing attractive flush wall surfaces.

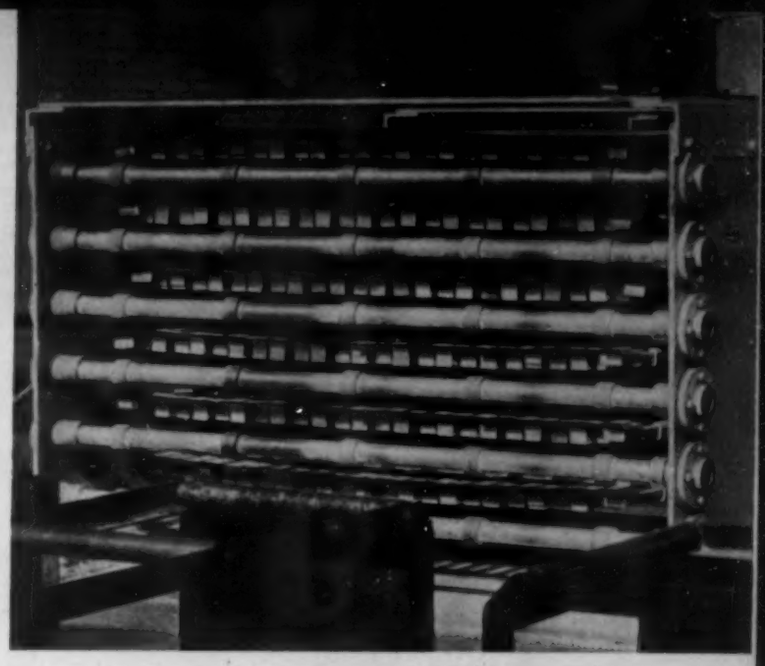
Whether the board is used for prefabrication or is worked on the construction site, the densified wood edges make easy work of the fashioning of doors and cabinets or the assembly of ceilings and partitions. If specified, the material manufacturer can insert additional strips of densified wood at any desired interval in the structural board, thus insuring easy, economical handling in special applications.

In the shipbuilding industry the material is used for the construction of bulkheads, as single or double partitions between staterooms, for built-in cupboards and wardrobes, for furniture, ventilating frets, crash panels and special fitments. Here too the convenient method of joining and fixing has resulted in speedy erection and consequent labor saving.

Designers of railroad coaches have found the material strong and durable and easy to assemble in conjunction with other materials. Applications in this field include partitions, doors, table tops and other special fittings. In aircraft engineering, the emphasis is on the favorable strength-weight ratio and the material appeals to designers for secondary interial structures and cabin fittings. In furniture manufacture, this board combines the properties of a structural material with a high quality finish and can be fixed by methods common to the trade. It would be impracticable to list all the uses to which this material can and has been put. They range from panels for mounting electrical switchgear to collapsible centering for cast concrete work.

Testing the material

During the war, tests on Holoplast were undertaken for the Director of Scientific Research, Ministry of Aircraft Production, by several research agencies, notably the National Physical Laboratory at Teddington. The results, then the subject of a confidential report, have since been released to the public and give precise scientific confirmation of the qualities observed in the use



A six-daylight hydraulic press equipped with side-rams. "Charger" in foreground is loaded for the next batch



Above are typical examples of furniture, panelling and doors made of this laminated board. The table in the foreground is made from a single board, 8 by 4 ft. with a beveled densified wood edge. One important asset of material is that it will not support combustion

of the board as well as some hints as to most efficient uses.

Tensile tests were carried out on samples cut from both flange and web in a longitudinal direction and showed a tensile strength of 11.8 tons p.s.i. for the web and 12.8 for the flange. A transverse sample of the flange showed a strength of 5.4 tons p.s.i. The modulus of elasticity as determined from a test piece cut from the flange on the longitudinal direction was 2.1×10^6 p.s.i. and in the transverse direction 1.5×10^6 p.s.i.

Strut tests were conducted with strips of the material 7.2 in. wide and of lengths varying from 2.9 in. to 43.0 in., all cut in a longitudinal direction. A load of 19.72 tons was required to cause failure of the shortest piece, 17.64 tons for the 6-in. strip, 18.09 tons for the 7 in., 17.5 tons for the 8 in., 16.87 tons at 9 in., 16.73 tons at 11 in and 13.93 tons at 15 in. From that point failing load drops sharply to 3.05 tons for 43-in. strip.

These and other tests indicated that, when Holoplast panels are tested as a beam in longitudinal direction, shear deflection is unimportant, the full stiffness of the material is realized and a modulus of rupture of 8.3 tons p.s.i. is attained. When the panels are used as struts in the longitudinal direction the material is efficiently used where comparatively large loads have to be transferred over short lengths. From bending tests in the transverse direction, it is indicated that for maximum efficiency, panels generally should be used in positions where the main stresses are longitudinal. It should be noted, however, that the indicated strength of material is far above requirements for most applications.

Water resistance of the material was tested by immersing samples in water for 72 hr. with no resultant swelling or distortion. It was also proven to be unaffected by normal heat changes, most solvents, oils and organic and dilute mineral acids. It is impervious to vermin, white ants and other pests. One factor important in construction, shipbuilding and aircraft industries alike is the material's resistance to fire; it will not support combustion.

Tests on thermal conductivity showed a penetration of only 0.95 Btu per sq. ft. per hr. for each degree Farenheit difference between the temperatures on either side of the panel. If the panel cavities were filled with slag wool to a density of 10 lb. per cu. ft., the thermal conductance dropped to 0.80 Btu.

Two factors are important in considering the acoustical properties of a material: first, the amount of sound it will absorb — which determines whether a room will be dead, have a noisy echo, or be unobtrusively live; second, the transmission of airborne sound — which gives a hotel guest either quiet privacy or a ringside seat at the party in the next room.

Holoplast acoustic panels fitted with Cullum Kapok strips enclosed in scrim cloth showed a sound absorption coefficient of 0.30 at a 125 cycle per sec. frequency, 0.55 at 500, and 0.70 at 2000. This is approximately the same as the absorption coefficient of such special acoustic materials as Acoustic Flexfelt. The acoustical reduction factor for airborne sound was measured for a double partition with panel cavities filled with sand, a $2^1/_2$-in. space between the panels, and a glass silk curtain hung in the space. Reduction factor rose from 35 for a frequency of 100 cycles per sec. to 71 for a 4000 cycle frequency.

COLORFUL PLASTIC SCISSORS WITH rounded ends, specially designed for safe use by youngsters, were recently placed on the market by Safe-T-Play Toys, a subsidiary of Cruver Mfg. Co., Chicago, Illinois.



These stubby shears, measuring slightly more than 4 in. in length, feature rounded tips and roomy handles whose simple shape is easily grasped by little fingers. The Safe-T-Play scissors will cut several thicknesses of paper, but will not cut clothing or hair.

The halves of the scissors are injection molded of polystyrene in a 4-cavity mold which produces two complete sets. Colors include yellow, white, green, blue and red. Handles are chute-fed to an operator who picks up a matching set, inserts a brass rivet through the cored holes, places them beneath an air hammer and rivets them together by tripping the press with a foot lever. Each pair is tested for proper "feel" and if necessary, the air hammer operation is repeated.

After riveting, scissors pass on a conveyor belt to another operator, who smooths off the gates, located at end of handles, by means of a dry sanding belt. A third operator inserts scissors in die-cut printed cards which are packed 72 to a box.

Plastics Products



A multitude of uses can be found in the home for Quiltron, a quilted vinyl which comes in Picasso pink, Gainsborough blue, Goya red and Cezanne green. Made by Protex Products Co., Inc., the quilting is said to be soilproof, moth tight, will not crack or peel and cleans easily with a damp cloth. It can be used for bedspreads, closet accessories, slip covers, draperies, etc.



Phenolic, polystyrene and metal combine in a radio cabinet of Emerson Radio & Television Corp. Resinox case, molded in one piece, is painted to give desired pastel colors. Curved Lustron dial plate and station indicator has numbers molded in. All this is work of Plastimold Corp. Grille is fabricated from pierced metal

Plastics Products

Addresses of all companies mentioned on these eight Plastics Products pages may be found on page 200 of this issue



Things aren't as bad as they seem, for a damp cloth will whisk off the spots on this Gaytex fabric. Since the fabric has an invisible plastic coating developed by the Monsanto Chemical Co., hitherto "impractical" colors can be used freely around the house. Made by Fisher Plastics Corp., material may be cotton, chambray or rayon faille and is offered in over 20 designs



Good sports, partial to fly fishing, will probably also be partial to this molded Tenite II fly box that carries eight dozen flies, as well as leaders and line dressing. Victory Plastics Co. molds the box, for True Art Fly Co., in a flat oval shape that is easy to pocket and is tough enough to withstand 1200 lb. pressure. Boxes have clear lids, bottom sections are available in colors. Tucked away in compartments, flies are protected from dirt and mildew



Disposable cigar tips, along with the 5¢ cigar, are among the things which this country needs. And now that they are being made by Amb-A-Tip Cigar Co., they will probably find many enthusiasts. These tips, molded of Tenite, perform the function of a holder—eliminate chewed cigar ends and reduce tobacco stains. Tips are securely fastened to cigars so they will not slip off. When the smoke is completed they are discarded with the cigar



It's in the bag—and there it is well protected from moisture and unsanitary conditions. Fowl, fish and meat, quick frozen and packed in these Bakelite polyethylene bags, go from distributor to consumer without losing their sealed-in flavor. Because bags remain tough yet flexible at freezing temperatures they make good storage mediums. Traver Corp. fabricates bags that are odorless, tasteless, non-toxic, resistant to fats and brines

Joining the parade of products for beautifying milady, is a Dainty Beauty Dispenser for cold cream. The five-piece injection molded polystyrene item is comprised of base section and a cream container which slides up and down the rod in the base. Pressing down on the cream-filled container forces the cream out of a hole at top. This method of extraction is said to be quick and easy. During storage, cream is protected from hardening. Cambridge Molded Plastic Co. molds for C. L. S. Products Corp.

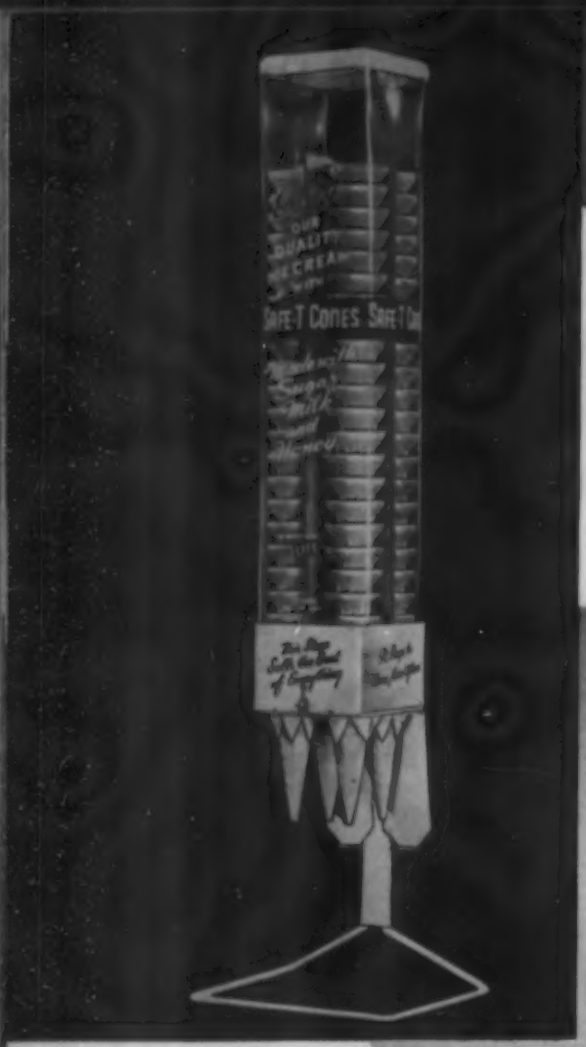


A functional rack which will keep the closet floor neat as a pin and shoes readily accessible. Utilizing the modern technique of laminating strong finished parts from selected thin veneers of wood, Wood Lines, Inc. markets such household products as this shoe rack. Vari-colored layers of wood are molded into curved shapes by the use of Melurac resin adhesive. In addition to its unique and tailored design features, the rack also has the exceptionally high strength and durability necessary for its use



Plastics Products

Addresses of all the companies which are mentioned on these eight pages are listed on page 200 of this issue



A long-time favorite, the ice-cream cone, finds a sanitary and convenient transparent holder in this one-piece Safe-T-Cone dispenser, formed from Lumarith by the Illinois Baking Corp. The tough and easily cleaned cellulose acetate sheet protects cones from breakage, keeps out moisture, eliminates needless handling



Pouring of dry loose materials from a jar ceases to be a problem with Pour-Top, a cellulose acetate lid with spout, designed to fit standard Mason jars. It is useful in kitchen for pouring rice; outdoors for fertilizer or seeds. Universal Plastics-Jiggs-Penny Corp. injection molds the cap in two pieces, and uses an 8-cavity mold for the base, a 6-cavity mold for spout

Druggists can now obtain a molding apparatus for forming 12 suppositories in one operation. The three-piece unit, fabricated of Plexiglas by Rothco Products Co. for distribution through Maris Corp., is opened and closed by butterfly nuts. Transparency of the acrylic permits a view of the forming process and its non-toxic qualities also assure sanitation





A happy alliance of Lucite, glass, aluminum and copper produces a cigarette box and ash trays whose simplicity lends an air of muted elegance to both modern and traditional decors. Ash-trays of this smoking set, manufactured by Fairbanks-Murray, Inc., and distributed by Mary Rodney, can be nested compactly beneath box to form a complete unit

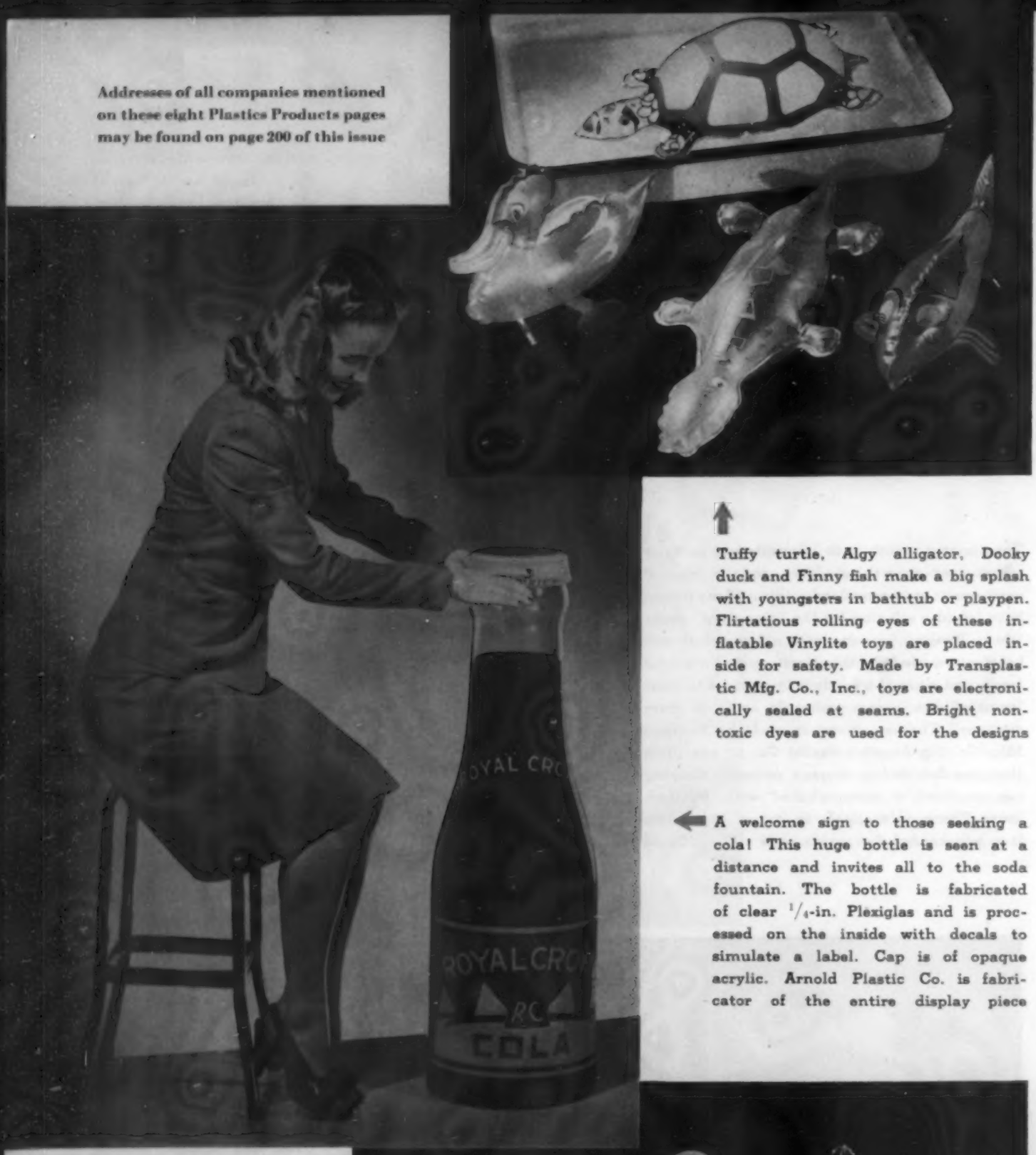
Time is at a premium in hospitals and doctor's offices, yet everything—down to the nurses' caps—must be immaculately clean. Many nurses have found a solution for the "clean cap" problem in Plexon. Cleaning with a damp cloth will keep caps made from this plastic coated material fresh, and since the fabric is impervious to most forms of dirt, grease and mild acids, it stays sanitary. The cap shown is made by Merland Mfg. Co. for Angelica Jacket Co. in one piece that lies flat during storage periods. Shaping cap to head is accomplished with buttons. Since Plexon is available in colors, the fabric is recommended for maids caps and uniforms





The Hero Manufacturing Co. uses Lumarith for this Knitter's Gift Set. The circular and straight needles which come in six different sizes and identifying colors, are made from dry extruded cellulose acetate. Smooth surfaced, they can be used with the finest of yarns without snagging. A safety pin for holding stitches and a knit count to mark progress are also included

Addresses of all companies mentioned on these eight Plastics Products pages may be found on page 200 of this issue



Tuffy turtle, Algy alligator, Dooky duck and Finny fish make a big splash with youngsters in bathtub or playpen. Flirtatious rolling eyes of these inflatable Vinylite toys are placed inside for safety. Made by Transplastic Mfg. Co., Inc., toys are electronically sealed at seams. Bright nontoxic dyes are used for the designs

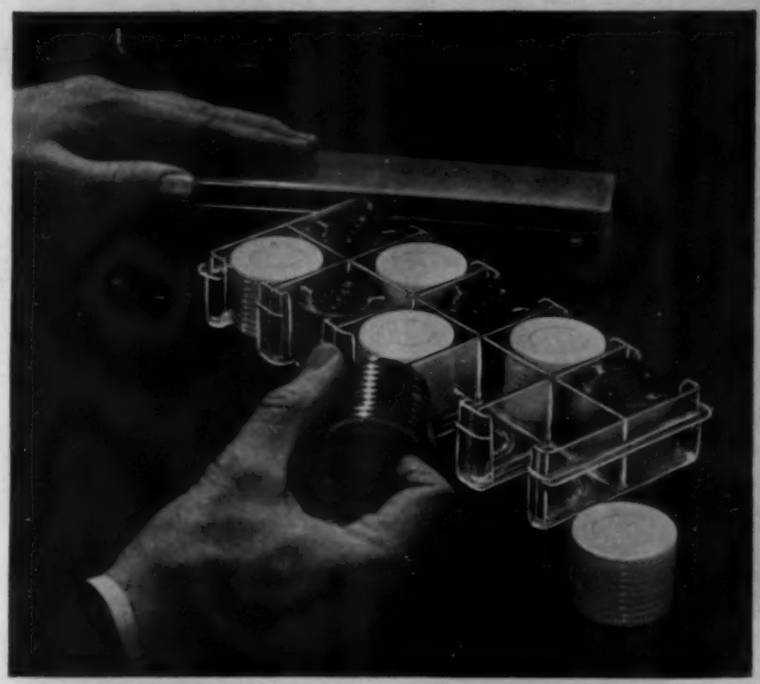
A welcome sign to those seeking a cola! This huge bottle is seen at a distance and invites all to the soda fountain. The bottle is fabricated of clear 1/4-in. Plexiglas and is processed on the inside with decals to simulate a label. Cap is of opaque acrylic. Arnold Plastic Co. is fabricator of the entire display piece



Horseshoes can be played indoors and out with this set molded of cellulose acetate by James L. Decker Products Co. Designed to prevent marring of furniture, game consists of 10 pieces—red, blue horseshoes, and stake-and-base sets in contrasting colors

Plastics Products

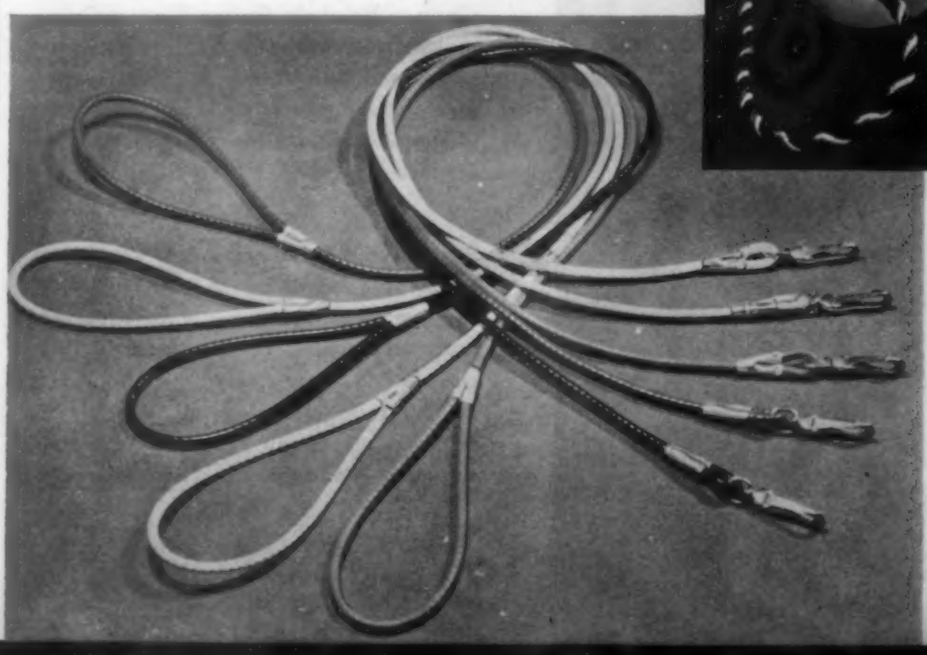
With the aid of a newly designed transparent Lustron holder and cover, the humble poker chip now decorates a player's table, literally as well as figuratively. The simple modernistic case holds 100 chips—and is molded of the same type of styrene. Interlocking ribs, which greatly enhance the appearance of the chips, were actually designed to make stacking easier for winner or loser. Reliance Molded Plastics, Inc., does the molding and manufacturing of all the set components



Just like the grown-ups'—this Revell toy telephone bank, a true-to-scale junior model, rings up the call each time a coin is dropped in the slot. Colorful decals of popular Disney characters caper about the red or white cellulose acetate and ethyl cellulose bodies of the phones. Made by Precision Specialties, Inc., unit consists of nine plastic parts which are molded in complete die having nine cavities. Parts are assembled in jigs after cleaning—about the only finishing required



Cater to your dog's individuality by dressing him up in leashes to harmonize both with his own distinctive personality and your current costumes. Available in a variety of bright colors, these latest canine accessories are fashioned from rayon cords coated with Geon plastic by Jessall Plastics. Durable and strong, the leashes will not crack, peel or stain and have the added attraction of being sufficiently flexible to roll up compactly and fit into either pocket or handbag

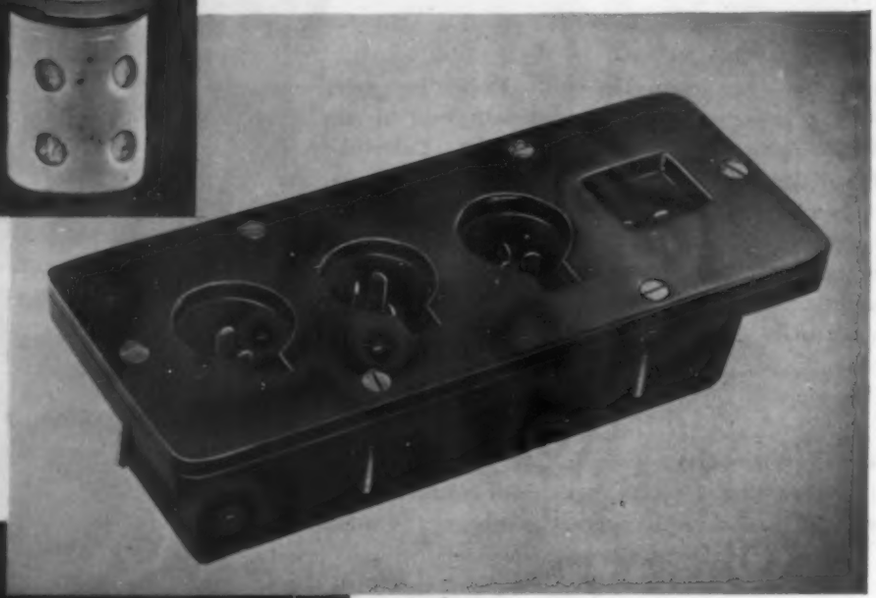


To facilitate inquiries, addresses of companies mentioned on Plastics Products pages appear on page 200

Plastics Products



This Bakerman has the job of keeping food products from drying out or becoming too moist. Body is injection molded in two parts by the St. Louis Plastic Moulding Co. from Tenite or Ethocel. The Clover Leaf Plastic Co. is distributor. A fast-drying du Pont lacquer paint is applied by hand. Water is put inside the baker and a plug containing humistat unit is screwed in. This unit regulates flow of moisture on applied suction principle and releases moisture as vapor gas when product needs it. Supply of water lasts a month



To facilitate inquiries, the full addresses of companies which are mentioned on these Plastics Products pages are listed on page 200



Pressing problems do not overwhelm owners of a portable electric garment presser. This lightweight and sturdy appliance quickly restores press or pleats. Reinhold-Geiger Plastics Corp. molds the handles and presser's heat enclosure of Bakelite for the Pressmaster Co. Material is an excellent insulator and is pleasant to the touch

A short run production job, this electrical plug board is made from Durez casting resin using easily constructed and inexpensive plastic molds. Terminals and connected wire are molded-in and fully insulated by resin. Unit is used in repair shops. Terminals fit most standard plug arrangements

Carrying through a good idea

The job is not finished till it is merchandised



Cellulose acetate, ethyl cellulose and polystyrene are used for the 13 plastic parts in this toy washing machine which actually works. The design of the unit simulates that of a full-size washer

TODAY, the readiness of buyers and the public to be sold good plastics products might be said to vary in direct proportion to the emphasis placed by a molder or fabricator on the words *sold* and *good*. Both the buyer and the public want quality goods, and they will buy that which is well merchandised.

The production and sales setup of Revell Plastics, a division of Precision Specialties of Los Angeles, Calif., is a good example of how a belief in the sales appeal of *good* merchandise well *sold* can be implimented. Starting with a good idea, this company carries it through to retail sales counters—and even on into the home in the shape of attractive, informative packages.

From laboratory to the consumer

Novel and useful product ideas are the starting point of this company's manufacturing process as is evidenced by the illustrations on this and the following page. Research laboratories take these and similar ideas and work out designs that are good both merchandise-wise and production-wise. Keeping abreast of new plastics materials and methods is another phase of the laboratory's job.

But even with a product out of the laboratory, through the press and on the retail counter the company does not feel that its responsibility for that item is at an end. Revell Plastics uses advertising in leading magazines read by potential customers to support the sales efforts of individual stores carrying its products. Newspaper advertising mats are made available to all its dealers for use as individual ads or as insertions in whatever larger advertisements the stores may carry. More direct promotion support is provided by the point of sales displays. And, finally, production and sales experts are ready to assist on individual dealer problems and to render special promotional advice. The promotion value of the boxes in which the products are packaged is another sales help that should certainly not be overlooked.

An example of good design

The child's toy washing machine, illustrated above, is a typical example of the thoughtful designing job being turned out by this company. In this instance, a thorough analysis was made of the properties a workable toy such as this should possess. Then a check was

made to see how plastics met these conditions. Tooling and production costs were also considered. And all elements were compared to those which would be involved in the manufacture of the machine from metal.

This preliminary work proved conclusively that the costs of tooling up and producing the toy from plastics were considerably less than they would be if the company made the parts from metal. Additional advantages accruing from the use of plastics are non-rusting characteristics and contours that offered no sharp edges.

Three different plastic materials are used in this workable toy washing machine—each picked for the qualities it was able to impart to the parts for which it was selected. Thus, Lumarith is the material employed for the eight separate pieces comprising the wringer and the two pieces that make up the agitator. Celcon is the plastic used for the all-white two-piece wash tubs while Lustron is the material employed for the same part when the upper half is transparent. Lustron is also used in the clear cover.

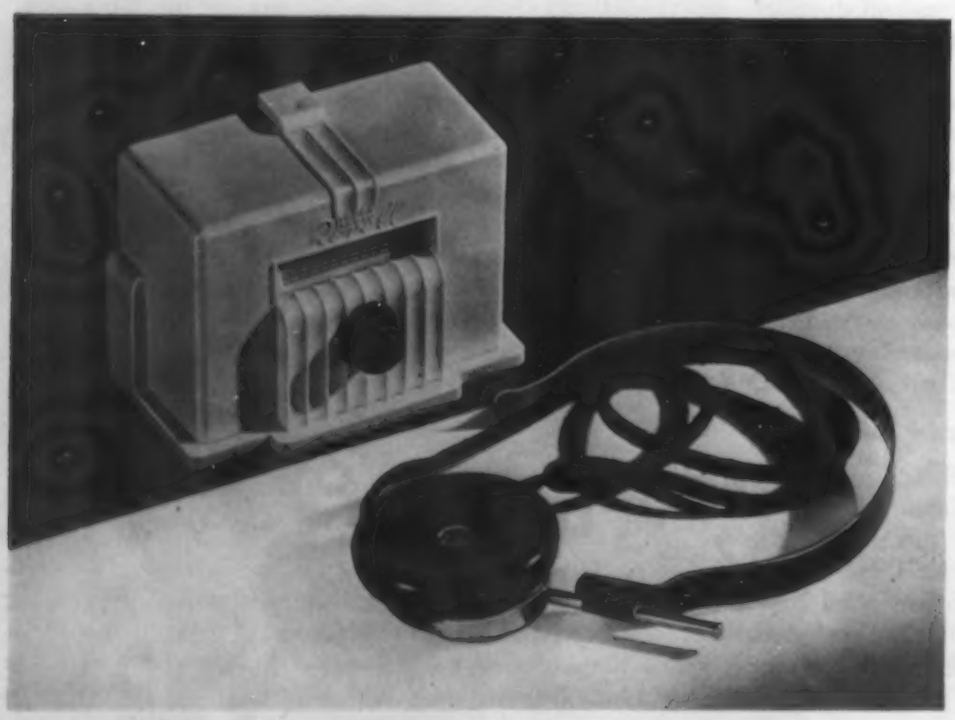
Only three different molds are used to produce all 13 pieces. The 20 pieces that make up two complete wringer and agitator sets are turned out in one die on an 8-oz. Reed Prentice injection machine. A similar machine is used to mold eight polystyrene covers at a single shot. The two parts of the tub itself are molded in a 4-cavity die on a 12-oz. Lester injection press. This same mold (capable of producing the parts for two tubs at one shot) is used regardless of whether polystyrene or ethyl cellulose is the material.

Finishing has been so greatly simplified in this plant that some blind and handicapped people are employed for this work. It takes approximately 8 min. from the time the washing machine starts down the assembly line for the unit to reach the end, all ready for packing. This period even covers the complicated assembly of the wringer which is, in a sense, doubly assembled. Not only are the halves of the wringer housing cemented together but the two parts are also held by plastic washers that slip around the ends of the two-piece housing and hold it together even should the cement fail. A metal spring in the wringer assembly permits the rollers to give a bit, adding greatly to the verisimilitude of the toy.

A workable children's radio

Plastics and workability were again combined by this company in the Radaradio (shown below) which—while in a sense a toy—incorporates all the newest developments in crystal reception. There were four reasons for the selection of plastics for this application. Plastics gave the set the strength needed to take the treatment customarily accorded such articles by children; it offered the good insulating properties needed in an application of this type; it possessed the attractive colors that would render the set easy to merchandise; it offered easy moldability to the rather intricate design of the outside surface of the housing. After due consideration, Celcon was the particular plastic selected for the housing of the crystal set; polystyrene the material for the back plate, dial pointer, pressure plate and shaft; phenolic the plastic chosen for the earphones.

A 3-cavity die is used for the molding of the cabinet which is available in either red or white; the back plate which supports all the mechanical parts of the unit is turned out in a 4-cavity die. Installation of the toy radio is simple. No electric attachments are necessary; a good aerial setup is all that is needed for the clear reception of several networks.



The case of this crystal radio set is molded of ethyl cellulose; the dial pointer, the back plate, pressure plate and shaft are of polystyrene; the earphones of phenolic

Plastics and production figures for 1946

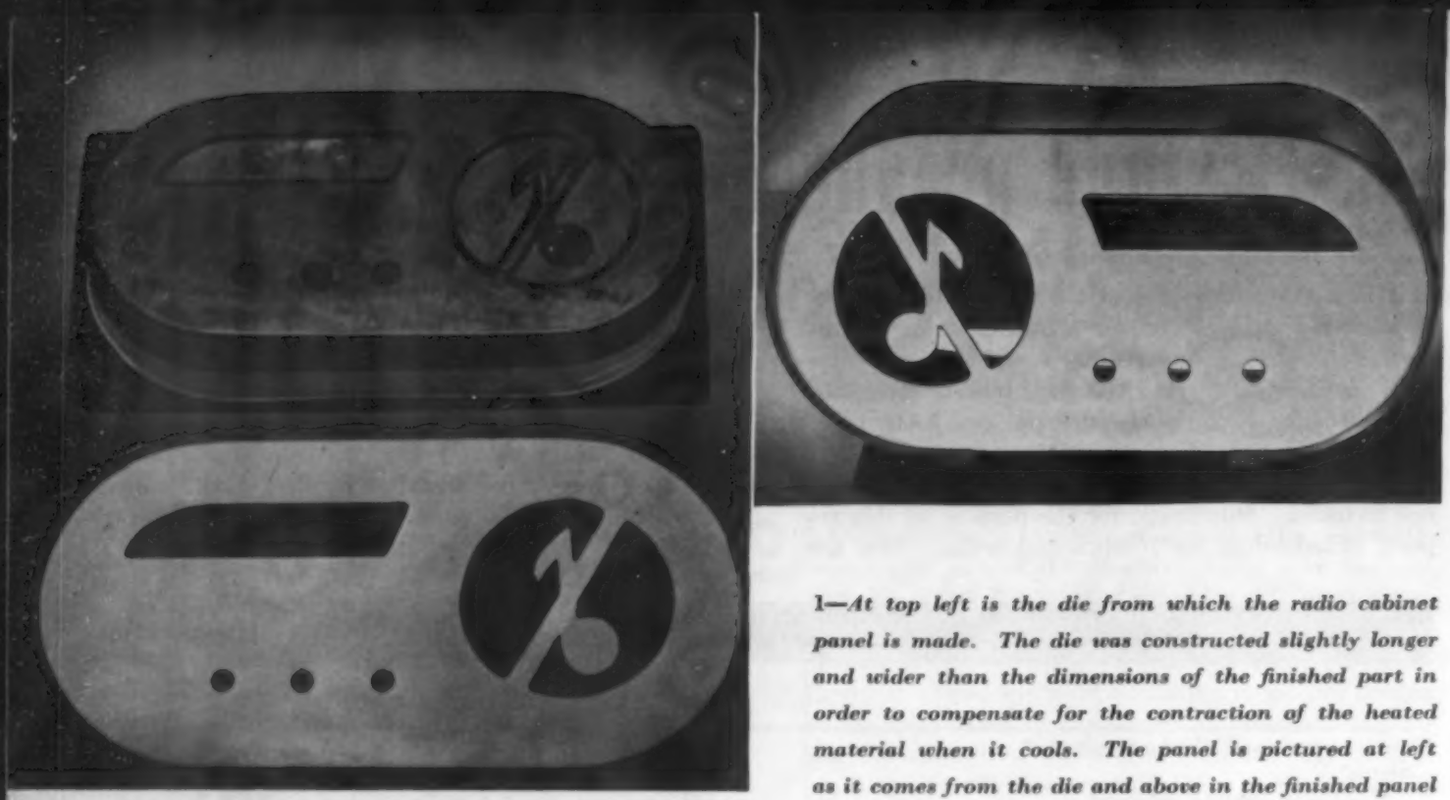
THESE statistics represent the shipments and consumption of plastics and synthetic resins as reported by 79 manufacturing companies and company departments. In December, reports were obtained from two additional companies (see footnote [c]), while one company discontinued operations.

Data for synthetic resins for protective coatings are not included. Shipments, for the purpose of this report, include data for plastics and resins which are manufactured by the reporting companies or company divisions and shipped to outside users. Consumption refers to the quantities of plastics and resins which are manufactured and used by the reporting companies or company divisions. Statistics are available beginning June 1945. Data for cellulose plastic products only are available for earlier periods. Readers should note that this report varies from the annual Tariff Commission study, which covers all synthetic resins.

PLASTICS AND SYNTHETIC RESIN PRODUCTION IN POUNDS—JAN. THROUGH DEC. 1946
From Statistics Compiled by Bureau of Census, Industry Division, Chemical Unit

Materials	*November 1946*	*December 1946*	*Total for 1946*
Cellulose acetate and mixed ester plastics[a]			
Sheets[a]			
Continuous (under 0.003 gage)	343,504	670,574	7,649,795
Continuous (0.003 gage and upward)	577,670	652,588	7,498,529
All other sheets, rods and tubes	151,933	367,587	4,717,401
Molding and extrusion materials	5,983,888	7,951,474	83,204,482
Total	7,056,995	9,642,223	103,070,207
Nitrocellulose plastics[a]			
Sheets	738,816	937,160	10,932,131
Rods and tubes	494,605	569,276	7,228,862
Total	1,233,421	1,506,436	18,160,993
Other cellulose plastics[b]	809,883	922,608	12,216,947
Phenolic and other tar acid resins			
Laminating (dry basis)	1,957,020	3,120,980	27,606,337
Adhesives (dry basis)	1,389,064	1,614,113	15,664,701
Molding materials[a]	8,770,827	10,579,844[e]	140,216,443
All other (dry basis)[d]	4,585,620[e]	5,185,017[e]	57,860,624
Total	16,702,531	20,499,954	241,348,105
Urea and melamine resins			
Adhesives (dry basis)	3,869,496	3,911,830	40,793,112
Textile and paper treating (dry basis)	1,357,622	976,008	13,534,368
All other, including laminating (dry basis)[d,e]	829,377	880,266	3,746,580
Total	6,056,495	5,768,104	58,074,060
Polystyrene[f]	7,215,827	8,091,951[e]	66,791,843
Vinyl resins			
Sheeting and film[a]	892,822	1,828,122	21,608,834
Textile and paper coating resins (resin content)	3,660,056	2,874,370	26,191,254
Molding and extrusion materials (resin content)	5,693,090	6,243,440	63,591,267
All other, including adhesives (resin content)[d]	3,209,380	3,260,779	27,440,424
Total	13,455,348	14,206,711	138,831,779
Miscellaneous plastics and resins			
Molding materials[a,g]	5,253,650	4,666,059	54,033,807
All other (dry basis)[d,h]	3,035,362	2,752,309	35,581,751
Total	8,289,012	7,418,368	89,615,558
Grand Total	60,228,084	68,056,355	728,109,492

[a] Includes fillers, plasticizers and extenders. [b] Includes methyl and ethyl cellulose and related plastics. This information represents a combination of molding and extrusion materials (statistics previously included with miscellaneous molding materials) and methyl and ethyl cellulose sheets, rods and tubes (statistics not previously published). For comparable figures for January–June 1946, see footnote 2 in August "Facts for Industry," Series M19H-86. [c] Includes operations for two companies not previously reporting; however, this does not appreciably affect the comparability with previous months. [d] Excludes data for protective coating resins. [e] Urea and melamine molding materials included with miscellaneous molding materials. [f] Dry basis, including necessary coloring material. [g] Includes data for urea and melamine, acrylic acid and miscellaneous molding materials. See footnote 9, Series M19H-86. [h] Includes data for petroleum resins, acrylic acid, ester resins, mixtures and miscellaneous synthetic materials. [r] Revised.



1—At top left is the die from which the radio cabinet panel is made. The die was constructed slightly longer and wider than the dimensions of the finished part in order to compensate for the contraction of the heated material when it cools. The panel is pictured at left as it comes from the die and above in the finished panel

DIE CUTTING heavy acrylic sheet

A method of using heated steel dies makes for speed and economy in cutting acrylic sheet. Close tolerances are possible through careful calculation of the expansion of plastic

A RECENTLY developed method of die cutting acrylic sheet is used by Ruzak Industries, Inc., of New York City in the manufacture of components of brushes, compacts, displays, radio panels and other pieces which were formerly fabricated by sawing and shaping or, in case of long runs, were produced by injection molding.

Illustrative of the uses to which this method can be put, the design principals that must be followed and the tolerances that can be achieved is the holder for a $^1/_2$ gal. wine jug (Fig. 4), the brush back and insert (Fig. 2) and the umbrella handle (Fig. 3). The jug handle, which is being manufactured for Edwin Bushman is stamped out, then formed. A slip-fit tolerance has been achieved in the brush back and insert. The umbrella handle, die cut from a thick lamination of colored cellulose acetate, shows clearly the type of round contours necessary in parts to be cut by this method.

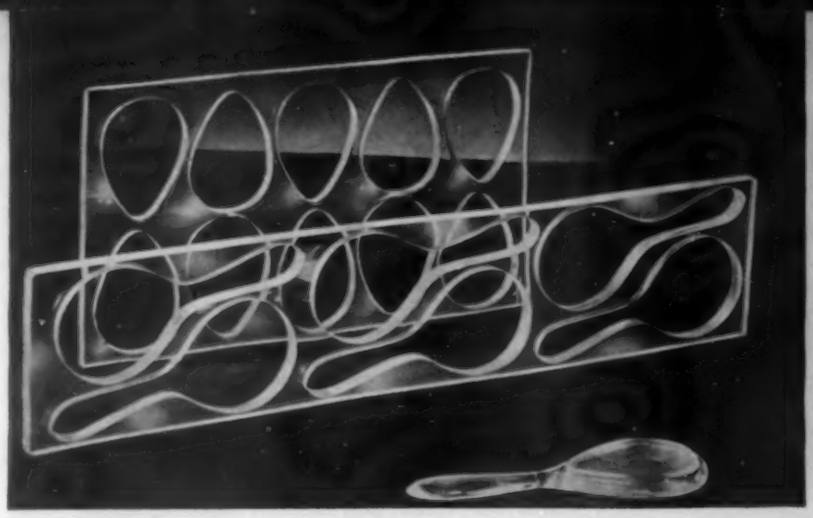
Single sheets of acylic up to $1^1/_4$ in thick can be cut using this method though most of the work is with material one inch or less in thickness. Depending upon the size and the thickness of the piece, the number of impressions stamped out per 8-hr. day runs between 2400 and 2800, with the press feed rate going as high as 20 parts a minute. This company has one gang die with 28 cavities producing pieces approximately $2^1/_2$ in. long by $^3/_8$ in. wide by $^3/_8$ in. thick from a sheet measuring about $3^1/_2$ by $18^1/_2$ inches.

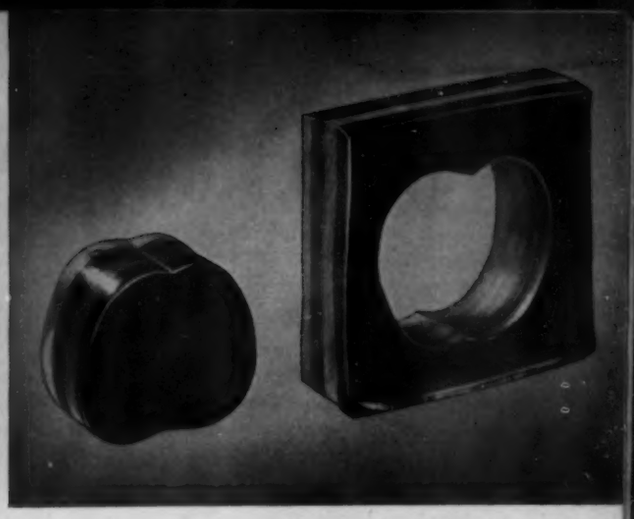
The die is the thing

It might be said that in the development of dies for this work lies the explanation for the success of the process. Made from oil hardened steel, these dies are ground on the cutting edge to what amounts to razor sharpness. The way in which this edge is held, an important factor in the success of the process, is attributable to the manner in which the dies are hardened.

The sharp edges of the dies, which are heated, cut directly against a bed plate of cold rolled steel. Spring actuated plates and pins are used as knockouts. The heating is by standard electric heating elements. The temperature, while fairly high, is not so high as to cause the material to stick to the die. No parting agent or lubrication of any kind is used.

The sheet material, too, is heated (in ovens) before being die cut. Naturally when the sheet material is





2 (Left)—Brush backs and inserts cut from acrylic, have slip-fit tolerance. 3 (Right)—Heart-shaped umbrella handle die cut from laminated cellulose acetate, has curved contours needed in this method

heated it expands and it is this expansion factor which raises problems in the design of the die. The dimensions of the die must be increased by the exact amount the material expands when it is preheated before stamping. This so-called oversize piece will shrink back to the specified dimensions after it cools.

In the case of the radio cabinet panel shown in Fig. 1, the die was constructed 1/4 in. larger on the length and 1/8 in. larger on the width, this being the amount the material will expand when heated. The material is heated until it is just soft enough to bend slightly when suspended by one end. The temperature of the heated material is very critical and must be held within 10 to 15° of the specified temperature. Some thin sheet stock can be cut without preheating although heated stock will almost always produce a better job. The temperature of ovens is carefully controlled thermostatically.

Pressure and speed of stamping

Another important consideration in this method of die cutting is pressure. Thus far, no specific rules can be given on this element. Each die must be classed as a separate problem in itself. However, the pressure requirements are governed by the thickness of the material, the area of the sheet and construction of the particular die being used. Pressures varying from 10 tons up to as high as 700 tons have been used.

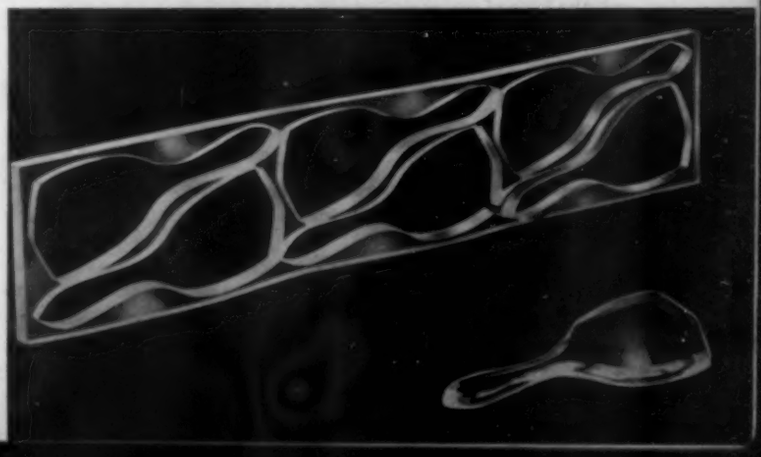
Probably the speed of the operation is controlled more by the preheating capacity of the ovens than by the speed of the press which may either be of the hydraulic or clutch-type. Handling problems also have some effect on the speed. The actual die cutting is carried out at normal stamping-press speeds.

A rough estimate on cost comparisons show that the stamping dies used by this company average approximately one tenth of the cost of an injection mold with a similar number of cavities. For example the cost of single-cavity injection mold for the radio panel shown in Fig. 1 would run from $3500 to $4000, whereas the cost of the die shown in Fig. 1 was approximately $400. Obvious labor and mold economies are subject to scrap losses. However some market is open to this material.



4—A single die-cut piece of acrylic, above, is used for this bottle holder. Circular base and tight-fitting neckband hold bottle in place while handle gives good grip

5—Another type of handle which can be die cut instead of being produced by injection molding is shown below. Single sheets up to 1¼ in. thick can be employed



S.P.I. low-pressure division meeting

THE second annual technical session of the S.P.I. low-pressure industries division was held at the Edgewater Beach Hotel in Chicago on January 23 and 24. Attendance was 185. Interest was intense, although directed more toward product development and marketing than toward purely technical matters.

Resin characteristics

The first paper on "Low-pressure resins: their chemistry and properties," was presented by Clare E. Bacon of the chemistry laboratory, Owens-Corning Fiberglas Corp. This technical session was presided over by P. R. Hofmann, United States Plywood Corp.

Mr. Bacon stated that low-pressure resins now available fall into two general classifications: condensing and polymerizing. Condensing resins include phenolic, urea and melamine. Polymerizing resins to which the term polyester is applied, include modified alkyd, alkyd styrene, unsaturated polyester, allyls and several others.

The polyester resins are available in viscosities ranging from water-thin liquids to very thick syrups. Monomeric styrene is a satisfactory thinner since it reacts with the resin. Polyester resins should be stored in closed containers in a dry room at a temperature not over 77° F. If so handled, they should be usable for four months or more. If the resin has been catalyzed, it will be usable for two days, if the storage temperature is kept below 60° F.; if refrigerated, the catalyzed resin may be stored for periods up to two weeks.

Catalysts used for polyester resins are generally organic peroxides of which there are several kinds. The purpose of the catalyst is to speed up polymerization of the resin and control the length of cure cycle.

The amount of heat and the rate of application must be carefully controlled for any given thickness of laminate. The addition of a special catalyst or activator will shorten the cure of any piece, but resins that have these materials added to them have a short storage life. Since exothermic heat is generated in the resin when polymerization takes place, the problem of dissipating it is important. Thin laminates or moldings lose their heat rapidly while thicker finishes take a much longer period of time. For this reason, the kind of material used in the mold and the mold design itself are most important.

During cure, a resin will first flow like water, then thicken to a gel; then cure hard and infusible. At the stiff gel stage, it is frequently possible to remove a molding from the press and cure it in an oven. All polyesters shrink during cure—most of them between 7 and 8 percent some as much as 14 percent. However, since the resins are 100 percent reactive materials, no loss of weight accompanies this shrinkage. Where monomeric styrene has been used to thin a resin, some of it can be volatilized during the coating processes.

Many efficient lubricants or mold release agents have been developed for polyester work, but the lubricant must be selected to suit the type of resin used and the mold surface.

Highly stressed parts for rigid structures are made with rigid polyesters. The heat distortion point for most of these resins will be around 300° F. On a Rockwell test, the rigid type is practically as hard as molded melamine or urea.

Flexible type polyester resins will retain flexibility under tough use at high temperatures. They may be mixed in nearly any proportion with rigid type resins to obtain a desired degree of stiffness. The addition of flexible to rigid resin produces a very tough molded piece.

Recent modifications of certain polyesters have made them available to the post-forming industry and it is now possible to produce post-forming stock with continuous laminating resins. Special flame-resistant types of polyesters are available for the manufacture of laminates with the proper type of fillers. These will burn when in contact with a flame but will stop burning when the flame is removed.

Sheets of filler material may be impregnated with polyesters to produce either a dry or wet low-pressure molding material. The dry sheets are either polyester-thermoplastic combinations, phenolic-thermoplastic combinations or low-pressure phenolic resins advanced enough to eliminate tackiness. In using wet sheets, it is wise to reduce handling as much as possible.

Low-pressure standards

William B. Darling, Riegel Paper Corp., presided at the luncheon at which Paul R. Hofmann presented the progress report of the Low-Pressure Standards Committee.

Mr. Hofmann stated that the surface has just been scratched in this whole matter of standards but that the Committee is well pleased with progress and will carry the project through to its final conclusion.

Competitive situation

Speaker at the luncheon was James W. Greig of Woodall Industries, Inc., who spoke on "Low-pressure laminates in competition." Deploring the too-general attitude that low-pressure laminates are competing with other laminates, Mr. Greig stated that they should be in competition with other materials to further the laminating industry. Both high- and low-pressure decorative paper laminates are higher in cost than many other materials but their permanence and performance make them economical to use. Up until recently they have always had to be laminated to supporting structures, either flat or with straight bends, to give them good impact strength. But new developments[1] combine good strength and high impact qualities, wear resistance and decorative value.

Where production runs are relatively low (say 10,000 units) and where dies to press a piece out of metal would have a tremendous cost, the higher price of plastic resins and fillers is discounted by the lower cost of dies or molds for use with these various materials.

Mr. Greig foresaw continuous laminates taking over much of the decorative laminating field, since they can be made in any thickness and flexibility, are free from warp and may be die cut readily. This material, he stated, is also post-formable. It is also capable of producing formed or structural shapes through the use of a wide variety of core materials such as glass, coated fabric and others.

In low-volume parts such as boats, custom furniture, etc., the rigid molded laminates should be good because of the little equipment required and because of the ease of molding.

Flexible type decorative laminates should be competitive with vinyl coated fabrics, although the cost of the former has not yet been determined. A thermoplastic laminate can be combined with printed papers, woven colored cloth and other materials to give an endless combination of decorative effects. It can be used with or without core in colors or transparent, can be processed by sewing, can be embossed, can be formed on wood tools and can have high impact strength.

Mr. Greig suggested that the sooner these new materials be-

[1] "Laminates take over interior paneling in postwar automobile," MODERN PLASTICS, 24, 112–117 (Jan. 1946).

come known and recognized by engineers and designers, the better it will be for all the plastics industries.

J. E. Stokes, Bakelite Corp., presided at the annual banquet which was addressed by Robert Reaney of the Hamilton Chemical Company.

Molding and finishing

The second luncheon was presided over by T. Walter Noble of Fabricon Products, Inc., and was addressed by A. W. Wiles of General Electric Co. whose subject was "General techniques of molding and finishing low-pressure molding products."

Mr. Wiles, defining General Electric's conception of low-pressure molding pressures, stated that pressures ranging from 5 to 100 p.s.i. are used when a rubber plunger is the pressure medium and pressures from 5 to 80 p.s.i. are used where the pressure is applied by means of a rubber bag or diaphragm.

Part designs originally intended for fabrication from wood or metal usually are not satisfactory for low-pressure molding since they lack the large sweeping radii. Undercuts should be avoided because (while they are possible to mold) they add to the cost of the finished part. Any low-pressure part may have molded in it many types of inserts—of wood, paper, metal or foam—for reinforcement and attachment. Low-pressure molded parts should be designed, engineered and tooled to effect minimum finishing labor. Material selection is important and frequently use of the highest cost material will be justified by reduction of labor content in the part. Larger parts should be designed for mold finish on one side only.

One of the most unusual jobs of low-pressure molding yet undertaken is that of building the vacuum chambers for an atom smasher. It is one of the heaviest walled low-pressure parts ever manufactured. The largest is 9 ft. in diameter, weighs nearly 800 lb. and is molded with a wall thickness of 5 inches. The extremely heavy wall section was made by an overlay method of buildup and molding. The heavy section could not be molded at one time since the reduction in bulk factor creates many wrinkles and voids throughout the structure. Test specimens indicate that there is little difference in strength in parts made by the overlay method and those made in one molding.

Another method of buildup is a dry method using mat filler. This method was used in the manufacture of toy sailboats in a mold approximately 40 in. long made of hand finished cast aluminum. The mold is operated in a conventional type hydraulic press and pressure is applied by means of a solid rubber plunger.

Phenolic treated paper or cloth or mat is an easy material to lay up, since it is dry at the time of buildup. One method of holding the material in place until the buildup is inserted into the mold is by tacking the material in spots with a high frequency spot welding tool or a hot iron.

General Electric's Plastics Division uses largely, molds fabricated from sheet metal made by spinning or hammering the metal over form blocks or welding to shape. These molds are self-contained and, to reduce cost further, each mold is built to fit into a cylindrical tank which is divided in the center so that the mold may be opened. This type of mold makes possible a removable cavity and eliminates the use of an autoclave which in Mr. Wiles' opinion is an expensive method of low-pressure molding because of the quantity of steam required and the direct labor content. The sheet metal molds of the removable cavity type are kept from collapsing by a pressure balance system.

For finishing, low-pressure parts may be painted with many types of paints, lacquers. Another method imparts a single color to the surface by using a mold coating where a heavy pigmented resin is applied to the mold prior to the layup of the impregnated material. This resin bonds into the part on its surface. Still another method is to sand lightly the exterior of a part or apply a transfer film. It duplicates the grains of wood, marble or other materials.

Ease of repair of low-pressure molded parts is an advantage The void is roughened and the cavity filled with a mixture of loose fibers and the same type of resin used in the construction of the part. The void is filled, leaving excess material on the surface for shrinkage, and heat is applied locally for cure. When cured, the patch is ground down to the contour of the whole part. Repair is exceedingly strong and becomes a part of parent material.

Rubber bags and diaphragms must be tailored to fit the cavity to exacting dimensions. General Electric has special methods of clamping free edges of bags or diaphragms to one member of the mold, the best method being one in which the steam pressure used for cure clamps the bag to the assembly.

Silicone oil or grease and waxes seem to be the most popular parting agents in low-pressure molding.

Low-pressure forum

With Robert J. Brinkema of Egmont Arens as moderator, a forum discussion was held with the following panel: Charles K. Everett, Cotton Textile Institute, Inc.; William B. Darling, Riegel Paper Corp.; James W. Greig, Woodall Industries, Inc.; Irving B. Polhemus, Catalin Corp. of America; A. E. Wiles, General Electric Co.; F. E. Lee, Frank C. Snedaker & Co.; and John J. Townsend, Lloyd Associated, Inc.

The forum provided an index to opinion in the low-pressure field on its present status—an opinion which was in accord with remarks of speakers earlier in the program. A prominent West Coast fabricator, emphasized the point that the industry has been so wrapped up in seeking a perfect material and dramatic applications that "we forget we must make a living at it." What the industry needs, he insisted, is high production of less sensational articles—and products for which there is a general demand.

H. E. Gerhart of Pittsburgh Plate Glass Co. stated that his company is doing much research on the casting properties of its resins and had successfully cast haze-free blocks 50 lb. in weight.

Opinion on speeds of continuous lamination from various delegates was to the effect that laminating speeds of 20 ft. per minute were highly optimistic. Cecil Armstrong of Armstrong Plastics Co., pointed out that a total running time of 7 hr. out of 8 would be considered about average, due to stops, adjustments, etc. He also showed that a continuous laminating unit bears a low labor cost since it requires little manual attention.

R. C. Platow, Bell Telephone Laboratories, suggested that more specific study be given to the fundamental physical and chemical properties of the various low-pressure resins. Material manufacturers present declared that there are so many variables to consider that it is advisable at present for users to develop as much of their own data as possible.

Charles K. Everett, Cotton Textile Institute, Inc., stated that current production of cotton textiles is 10,500,000,000 yd. per year compared to a prewar average of 6,500,000,000 yards. In addition to the prospect of increased supplies of laminating fabrics there is another bright spot in the research into the laminating field being conducted by textile firms.

Irving Polhemus, Catalin Corp., expressed the view that a gradually declining price trend might be expected on low-pressure resins but any prediction might be offset by labor developments and other factors.

To the question "What type of finish can be used on laminated Fiberglas to improve its water resistance?" Clare Bacon, Owens-Corning Fiberglas Corp., replied that a new product called Finish 14 which involves a chemical bond between the resin and the glass when applied to the Fiberglas fabric can be used successfully with both phenolic and polyester resin in the low-pressure field. William Darling, Riegel Paper Corp., stated that the large molecular sizes of polyester resins make their use in impregnating paper difficult, but that a process might be used in which another resin would act as a wetting agent for the fibers to make them attract the polyesters.

While the second annual session of the low-pressure group showed how, in a year, little progress in product development had been made, it also showed that much refinement of technology had gone on. The industry has acquired an awareness of the importance of good design and use of its materials.



1—Dangers of fog are minimized by a haze lens molded of polystyrene. With a wall thickness of about 0.100 in., the lenses are molded in a 4-cavity die using fan-type gate to insure good material flow

Auto haze lights of polystyrene

Designed to snap on sealed-beam headlights, these one-piece lenses are molded in 4-cavity die

THE auto haze lights which Atlantic Plastics Co. of Flushing, N. Y., are now producing of Lustron at the rate of 60,000 pairs a month for Hazelite, Inc., are particularly significant for two reasons:

1. For a polystyrene molding with a wall thickness of 0.100 in., total projected mold area is very large.

2. The finished lenses must be optically clear. It is not possible, as in many other applications, to remove slight surface irregularity by buffing or to pass parts that show faint flow marks. With these lenses, any piece that is not absolutely perfect must be rejected.

Working out the cycle

Both the design of the piece and its molding were worked out over a period of time. As finally approved, the one-piece lens appears to be assembled from three concentric rings, separated by slight ridges. Eight holes are molded into the rim of each lens to facilitate assembly between the inner and outer shells of the sealed-beam headlights—the only type of headlights on which they can be used.

The polystyrene, which is used in pelletized form,

2—A clever means was devised to remove these molded lenses from injection mold. The central ring in lens is molded by a movable plug which acts as a knockout



is a special color formulation made up by the material supplier to match the color used in fog lights.

The total molding cycle is rather slow—67 sec. to be exact. The injection time is 12 sec.; the dwell under pressure of the piston, 39 seconds. Both the timing and the pressure, which is now set at 17,000 p.s.i., was reached after considerable experimentation.

When the company first ran this job it attempted fast injection—injecting the polystyrene material in 2 or 3 sec. under a pressure of 20,000 p.s.i. Production men found, however, that due to the turbulence created in the material by such speed and pressure, dog skin surface resulted. It took approximately three weeks during which the molder ran very careful studies of all variables in the molding cycle, of all variations in temperatures of molds and the preheated material and of the plastic material itself before the slower cycle and lower pressure were arrived at.

Designing the mold

The eight assembly holes molded into the rim of these lenses required the use of considerable ingenuity by the mold designer and the mold maker. Since they had to be molded at an angle to the draw, a single pin could not be used to mold the full depth of any one hole. Such mold construction would create an undercut, making it impossible for the part to be stripped from the pins without shattering. The solution to the difficulty was found in the use of pins of a length equal to one-half the depth of any of the holes. These half pins were then positioned in both the force plug and the cavity so they met to form the full depth of holes.

A fan-type gate is incorporated in the mold in order to assure the even flow of the polystyrene to all parts of the cavities, for without even flow the lenses will not have the desired optical clarity which is necessary.

Very clever use was made of the design of the lenses in working out a means for removing the 14-oz. shot from the mold. The central ring of the molded lens is molded by a movable plug which acts as a knockout. Figure 2 shows how this plug operates.

Cooling water is run through the force plug side of the mold—the side nearest the heating chamber—not through the cavity side. The cavities run at a fairly warm temperature which is controlled by the heat picked up from the injected material and from the force plug side when the mold is in the closed position.

Finishing and assembly

Gates are removed from the molded lenses by a hot knife (Fig. 3). The operation is accomplished by holding the part in one hand, the runner in the other, and pressing the gate against the hot knife until it melts. It was found that removal of the gate by more common methods caused the molded piece to chip and crack.

The assembly of the metal spring clips that hold the lenses in place over sealed-beam headlights is not difficult. The operator places a lens in such a position that two small rivet guide pins protrude through two molded-in holes. One of the spring clips is then placed so that its two holes are over the same rivet pins. The automatic riveting machine finishes the job.

When Atlantic Plastics Co. started on this job the efficiency of the run was only about 20 percent. At present this figure has been raised to 90 percent. This figure takes on added significance when it is remembered that the 10 percent of rejects include not only the poorly molded parts and those that are broken in assembling the metal clips but any lenses that show even slight surface and flow marks.

3—Gates are removed from the molded parts by a hot knife blade which melts the polystyrene at the junction of the gate and the lens rim, leaving a completely clean edge



4—Metal clips, which hold lens to headlights, are easily assembled. Holes in clips are matched to molded-in lens holes by slipping both over rivet guide pins





PHOTO, COURTESY DUREZ PLASTICS & CHEMICALS, INC.

1—All five molded phenolic parts in this calculator typify the modern lines that can be achieved through use of plastics in housings

Trends in molded plastic housings

Light weight, permanent finish, molded-in color, low finishing costs are among the advantages of plastic housings

PLASTIC *houses* are a long way off; plastic *housings* have been here for some time—and an increasing number of business machines, radios, clocks, vacuum cleaners, cameras, razors and other items are being and will be housed in plastics. There is incidentally a trend toward larger plastic housings.

The history of plastic housings is one of constant struggle. First, there was a struggle against the inertia of manufacturers who were loathe to change to plastics from wood, metal and other materials, regardless of the fact that the molded housings might be less expensive, more efficient and have greater sales appeal. Then, there was the struggle over design, with the early plastic housings copying those originally made in other materials, even to the extent of trying to duplicate the finish of the other material. Soon, however, both material manufacturers and designers began to realize that plastics had an intrinsic beauty of their own, that they need not be made to look like wood or any other material, and that plastic housings with fresh functional lines would have a widespread sales appeal.

First the designers had to learn what could be done with these new materials. Overly thin wall sections, insufficient ribs and fillets, sharp corners which tended to concentrate internal stresses, unsuitable materials were used more and more infrequently, until today the risk to the manufacturer who converts to a plastic housing has been cut practically to nil.

Consumer attitude toward plastic housings caused another phase of the struggle. Some housings were designed that would support the weight of a good-sized man, withstand considerable shock and have dimensional stability. Others were entirely too fragile. The public was, and still is, inclined to accept without credit molded pieces which would stand up year after year in constant service but to remember with distaste those which deteriorated rapidly.

The great mass of consumers do not know or understand plastics. If the veneer peels off a wooden housing, if a metal one dents, the user is inclined to accept the condition as natural; but if anything happens to a plastic housing, the blame is loudly placed on the material and the maker.

Advantages of plastics

However, the advantages of plastics were so obvious that the big swing to molded housings was a natural result. First, plastics have some very definite qualities

not to be found in other housing materials. They have durability. They retain their finish from day to day, year in and year out with little or no attention, for the finish is not applied—it is an integral part of the piece and cannot chip or peel.

Most plastics in the thermosetting category have excellent heat resistance and will not warp when exposed to varying atmospheric conditions. This latter quality makes plastics particularly suited for use in radio cabinets intended for the export trade. Being non-corrosive and unaffected by atmospheric changes, they service well in all climates. First volume users of molded plastic radio cabinets were those manufacturers who were enjoying a large export trade.

The plastic housing is good, too, from the acoustical viewpoint, for most plastics are non-reverberating and tend to deaden sound, an excellent attribute in business machines, for example.

Another explanation for the rapid acceptance of molded housings is the remarkable economies which their use entails. Finished pieces, except for the removal of a slight flash or fin, are obtained right from the mold. Metal inserts can be molded directly into the housing and no insulation is required, for the plastic itself is an excellent insulator. Any number of colors can be obtained using the same mold. Shipping weight is usually reduced, for the weight of a plastic housing is generally less than one made from wood or metal.

These same advantages, which dictated the acceptance of plastics in peace, account for their use in war—and used they were in myriad ways. Sometimes they were substituted when other materials were less available. More often than not, it was found that plastics were used because they did their job as well or a good deal better than non-plastic materials they replaced.

What material and why

In all materials, special formulations have been developed for housings. Thermosetting compounds—phenolic, urea and melamine—are provided with low specific gravity, excellent physical properties such as flexural, tensile, compressive and impact strength, long- and free-flowing characteristics, and a fast cure. Special thermoplastic materials are provided for injection molding of housings to allow for softer flow. In both cases molding cycles have been speeded up. This, quite naturally, has the effect of reducing production costs.

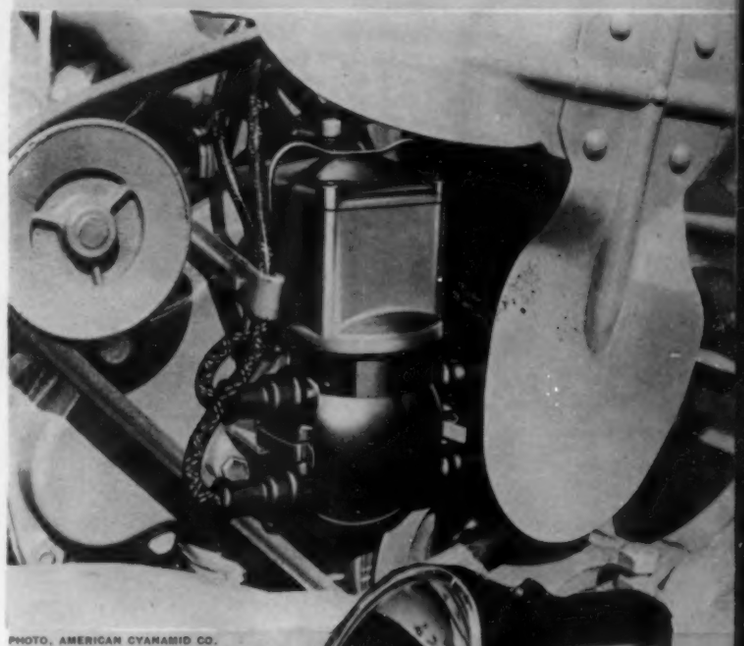
A major development in manufacture of housings from thermosetting materials has been electronic preheating, whereby the molding powder preforms or tablets are heated by high-frequency electric current and thus softened for ease of flow before being placed in the molding cavity. Indeed, some of the largest plastic housings that are now in use could not have been produced economically without this high-frequency development.

Typical housings

Illustrated herewith are a few typical housings showing the application of the principles outlined above.



2—The two parts that comprise this lamp housing are injection molded of cellulose acetate. This is example of how use of plastics has simplified assembly problems



PHOTO, AMERICAN CYANAMID CO.

3—Melamine was a good choice for the molding of this distributor cap housing due to its resistance to arc tracking



4—The excellent flow properties of ethyl cellulose facilitate the molding of this sturdy flashlight housing in one compact piece

Figure 1 shows a Remington Rand calculator, with five parts, molded from Durez. It is a good illustration of the principle of streamlined design with no sharp corners.

The housing of the Thomson Mobilite (Fig. 2) is designed for mass production by the Watertown Manufacturing Co., Watertown, Conn., for S. H. Thomson Manufacturing Co. Injection molded of cellulose acetate in two halves, it permits the electrical portions, including the cord, to be assembled into the light before the assembly of the two shell halves.

Figure 3 shows a Melmac distributor cap for Ford Ferguson tractors. The molding material was mineral filled, providing excellent heat resistance and high resistance to carbon tracking.

The three-cell safety flashlight of Justrite Manufacturing Co. shown in Fig. 4 is molded from Ethocel, and the uses to which it is put determined the choice of material. Intended for work in industries and in the mines where it would be subjected to a lot of punishment and where the fire hazard is considerable, the product is made with the case molded in one piece.

Figure 5 shows the new P. R. Mallory & Co., Inc., capacitor, the case being molded from Bakelite by Northwest Plastics, Inc., St. Paul, Minn. The old type capacitor for motor starting was furnished with cardboard insulating sleeves which became soggy in time, were either tight or loose in their end caps and were difficult to mount. This model is thoroughly insulated by the material, has dimensionally stable caps and requires only two screws to put in place.

Styron is the material used for molding the Willard Storage Battery Co.'s battery which is shown in Fig. 8. These batteries have the advantage of being transparent, lighter than glass, stronger than hard rubber and easy cleaning. A prerequisite of the material's use in this application was immunity to the corrosive effects of electrolyte.

Beetle was used by Maico Co., Inc., Minneapolis, Minn., in molding the case of the Stethetron (Fig. 7), an electronic stethoscope. Chief advantages of material for product are good electrical properties, sound deadening quality, hard surface and clean appearance.

The lightning arrestors in Fig. 9 have housings molded from Tenite II, by Sterling Plastics Co., Union, N. J., for L. S. Branch Manufacturing Corp. They are used for fire alarms, telephones and telegraph circuits and contain cartridges filled with rare gas. Molded in two halves, the housing fits around the cartridge and

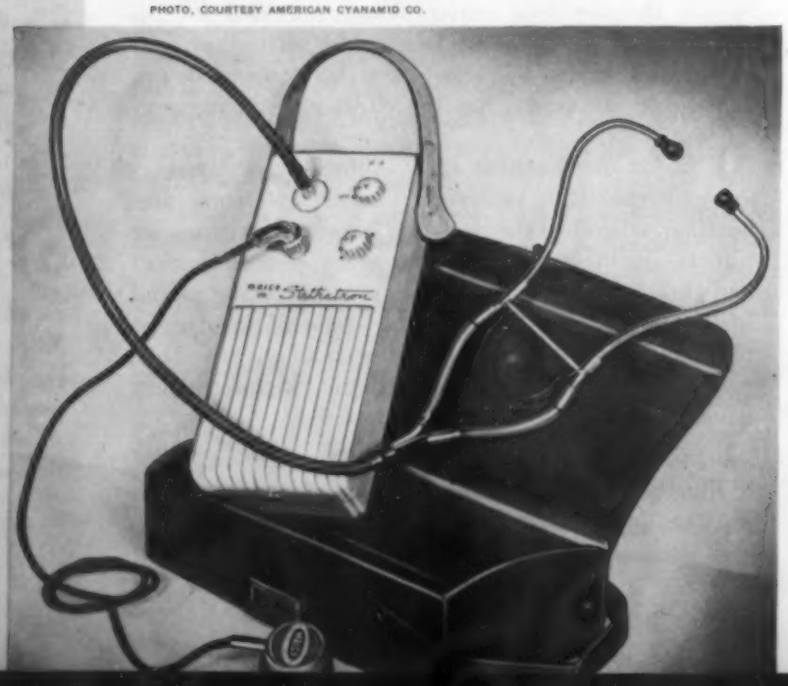
5—Phenolic is the plastic used in this capacitor case

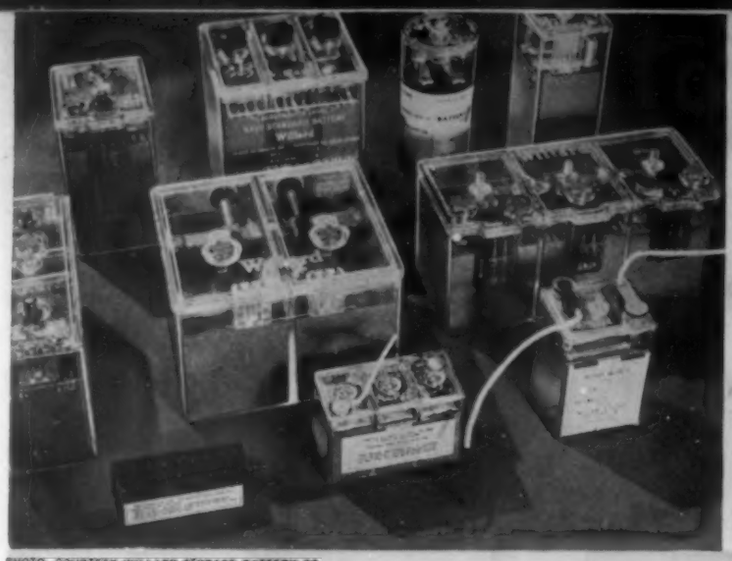




6—Use of plastics in a housing permits molding-in of ribs and bosses, as in two phenolic parts of this camera.
7—Urea is the material in stethoscope housing below

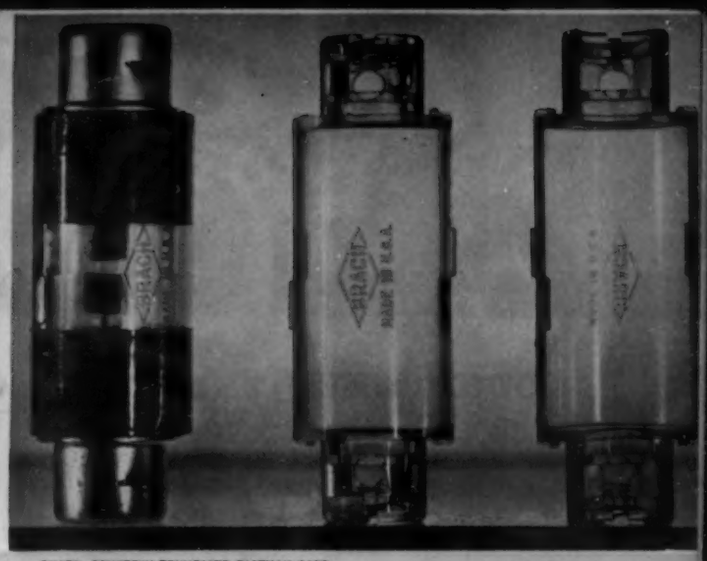
PHOTO, COURTESY AMERICAN CYANAMID CO.





PHOTO, COURTESY WILLARD STORAGE BATTERY CO.

8—Styrene battery housings have advantage of transparency



PHOTO, COURTESY TENNESSEE EASTMAN CORP

9—Lightning arrestor housings are of butyrate

fastens by means of interlocking undercuts, lugs molded into the pieces. Properly connected in lighting or high voltage circuits, the glow which indicates proper functioning of the arrestor is clearly visible through the plastic. The electrodes sealed inside the housing are free from dirt, atmospheric changes and other maintenance problems, and the tough material can withstand heavy blows without shattering.

Utility Manufacturing Co. had its Falcon camera molded from Durite by Industrial Molded Products Co., Chicago, Ill. Figure 6 shows case and cover, and well illustrates the use of bosses and ribs to give complete dimensional stability to the molded plastic parts and strength to a rather thin-walled black phenolic housing.

Another product for which a plastic housing was well chosen is the Toothmaster electric gum massager, molded from Plaskon by the Watertown Manufacturing Co. for Howard Industries, Inc. (Fig. 10). Clean ivory in color, water-proofed and designed to withstand vibration, the housing is built to specifications that permit the manufacturer to guarantee the appliance against faulty workmanship for a year. The gum massager unit is mounted on a rod of cellulose acetate butyrate, while the brush bristles are either nylon or natural bristle. Plastics are also utilized in the cord which is covered with a vinyl resin. This cord is not in evidence in the illustration at the right.

Broadened scope for plastics

The reader will note that in this article special mention is omitted of many types of plastic housings, such as radio cabinets, electric razor cases, vacuum cleaner shells, housings for kitchen mixer motors, etc. In the selection of items illustrated, we have tried to show that the fundamental rules of housing design and molding are good in all cases, while the versatility and wide variety of plastic materials available today have greatly broadened their scope of applications in this field.



PHOTOS, COURTESY HOWARD INDUSTRIES, INC.

10—Housing of this combination toothbrush and massager is of urea. Other plastics used in unit are nylon in bristles and cellulose acetate butyrate in massager rod

Micarta...

TOUGH WHEN THE HEAT'S ON!



When things get hot, Micarta—today's workable, industrial laminate—stands solid and unharmed in temperatures up to 230 degrees F. At zero and below—it actually increases in strength—with *no brittleness*. Micarta is no ordinary "plastic". It's a product which has proved to be the answer in hundreds of material needs in many industries.

Micarta has a combination of qualities which may solve the *materials problem* in your new (or old) product. In addition to heat resistance—it has:

HIGH STRUCTURAL STRENGTH—Half as heavy as aluminum with the same compressive strength.

REDUCES NOISE—absorbs vibration.

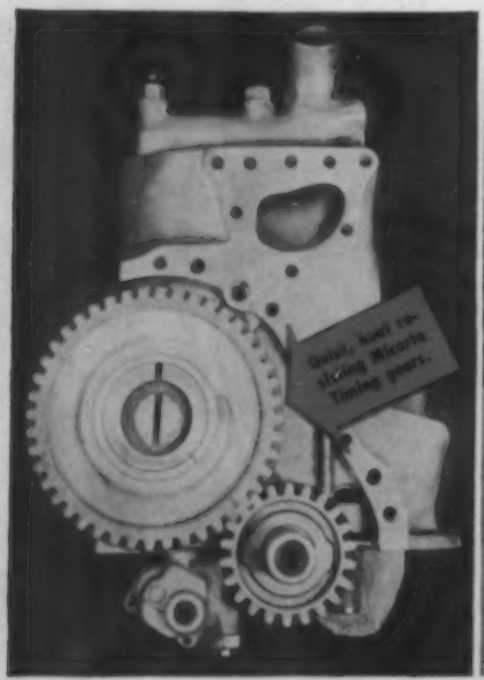
HIGH CORROSION RESISTANCE—unharmed by 10% solutions of most acids and alkalis. Resists oil and water absorption, too.

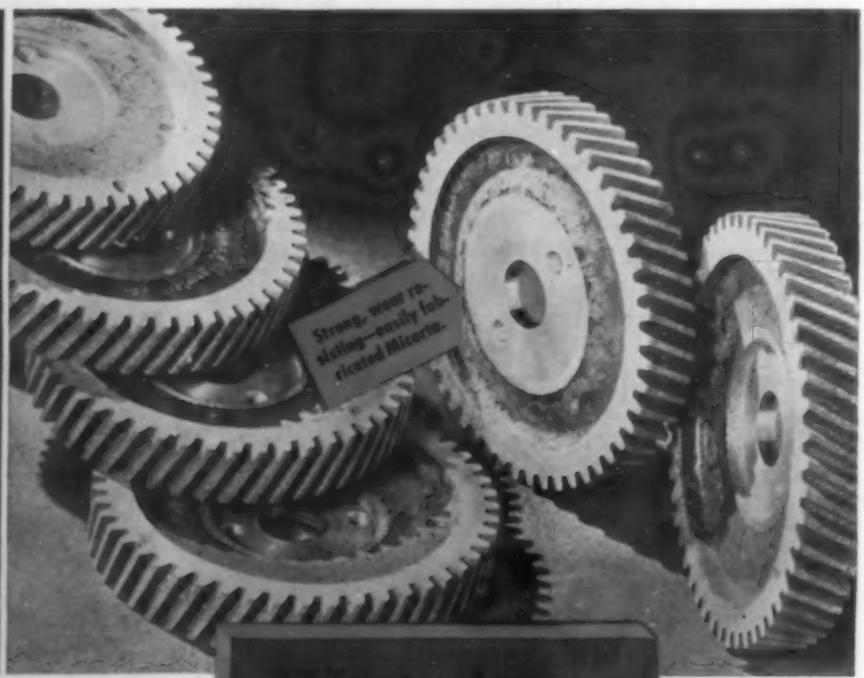
HIGH WORKABILITY—can be machined to close tolerances, drilled, thread tapped, sawed or die punched.

WITHSTANDS VIBRATION—"cushions" shock and severe vibration.

Design engineers have unlimited possibilities in Micarta. In various grades, Micarta can be completely *fabricated* in *mass production quantities*. The finished Micarta is shipped ready to apply.

When you have a tough material problem, remember *Micarta!* Call your Westinghouse office or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-06397





Send for this new Micarta Data Book today. Ask for B-3184-B.



Westinghouse
Micarta
THE INDUSTRIAL LAMINATE

Plastics Engineering*

F. B. STANLEY, Engineering Editor

Cost analysis of dielectric preheating†

by T. N. WILLCOX‡

MOLDERS in the plastics industry have generally accepted the benefits obtainable with dielectric preheating. Numerous publications can be quoted listing such benefits as increased production, lower molding pressures and reduced mold maintenance. Not so well understood is the effect of dielectric preheating on the cost of molded parts to a customer.

The purchaser of molded parts is primarily interested in the gross unit cost of these parts, including the write-off of tool investment, if any, and the rate of deliveries which his vendor can promise. The intelligent examination of these two last items is now possible on the basis of information derived from detailed studies that have recently been made.

For comparison, the following assumptions are made regarding a hypothetical plant operating both with and without dielectric preheating.

Assumptions regarding plant without dielectric preheat

1. Total of 250 presses covering normal distribution of tonnages.
2. Sufficient presses per operator so that no waiting for cure is necessary.
3. General use of infrared, hotplate or air oven preheaters.
4. An arbitrary cost structure as follows:

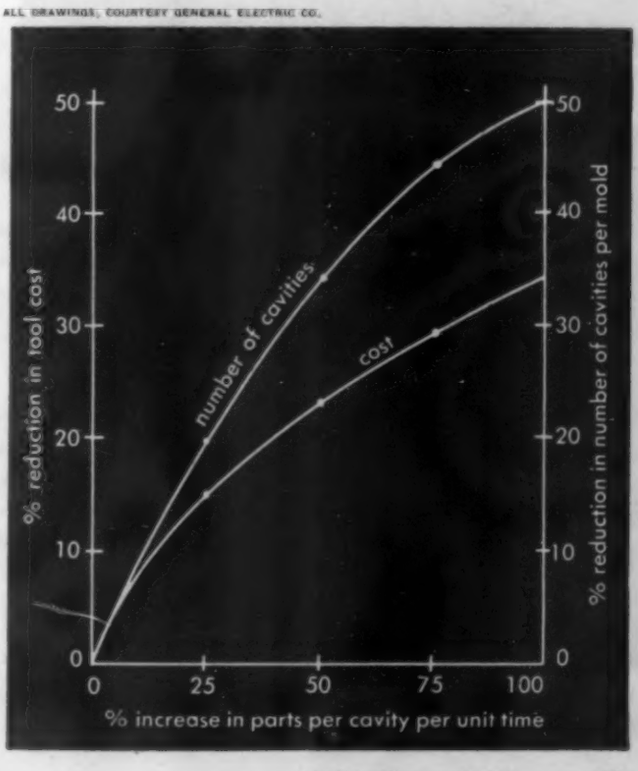
Item of manufacturing cost	%
a. Material	42
b. Direct labor of pressing	10
c. Direct labor of finishing	7
d. Overhead on pressing	16
e. Overhead on finishing	10
f. Spoilage	3
g. Shipping	2
h. Engineering overhead	10
Total manufacturing cost	100

Assumptions regarding plant with dielectric preheat

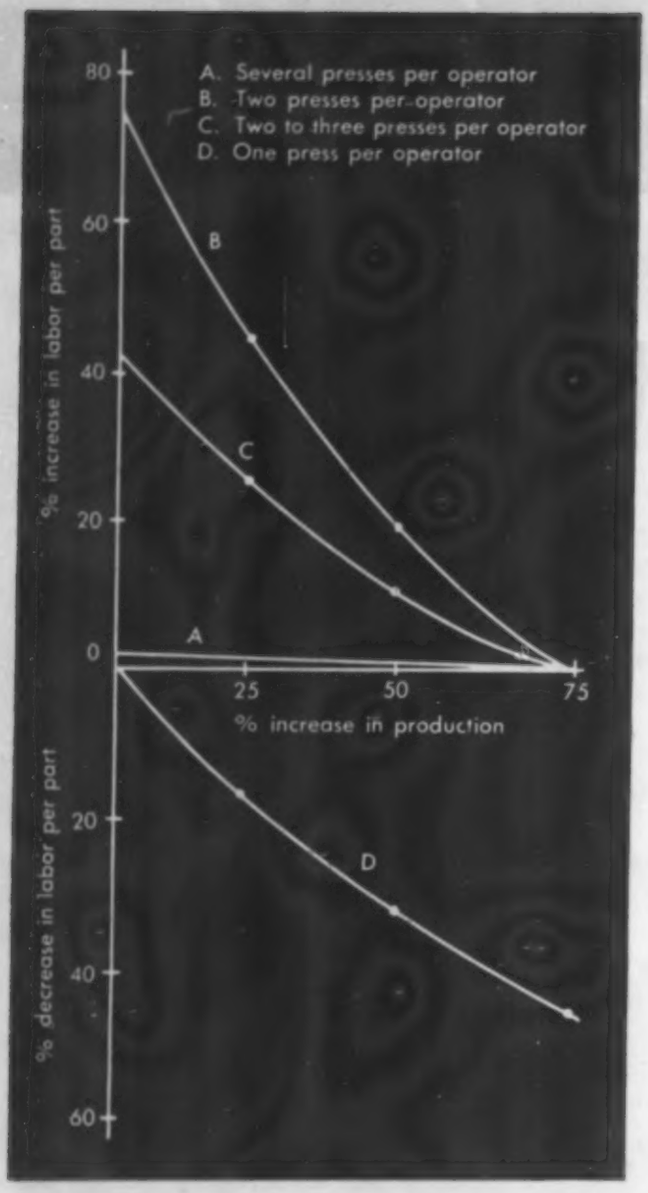
1. Total of 250 presses covering normal distribution of tonnages.
2. An average of two presses per operator with some waiting time for cure where necessary.
3. 125 dielectric preheaters to be amortized over 5 yr. period.
4. Assumed duty cycle for preheaters:
   4.0 kw. for 90 percent of time
   0.4 kw. for 10 percent of time
5. Electric power available at 1.2 cents per kwk.
6. Cost structure based on direct labor and factory

1—*Reduction in mold cost through dielectric preheating*

ALL DRAWINGS, COURTESY GENERAL ELECTRIC CO.



* Reg. U. S. Patent Office.
† Presented at the annual technical meeting of the S.P.E. in Chicago on January 27 through 31.
†† Chemical Dept., General Electric Co., Pittsfield, Mass.



2—The effect of dielectric preheating on pressing labor

cost. Percentage distribution to be determined as a result of this study.

7. An average increase of 75 percent in production now obtained on limited installations will remain 75 percent when a complete pressroom is equipped with dielectric preheaters.

Reduction in cost of parts

Each item of manufacturing cost (as well as tool investment) will be examined separately, determining its relative magnitude versus increased rate of production. This comparison is based on converting a complete pressroom of 250 presses from a mixture of infrared and oven preheating to dielectric preheating with an average of one preheater for every two presses.

Tool investment

Based on years of experience gained by the industry, it is an established fact that a very substantial percentage of orders placed for custom molded parts are in relatively small and uneconomical quantities. These orders warrant inexpensive molds on the cost of which no substantial savings can be appreciated.

On the other hand, production requirements running into many thousands of molded parts offer the possibility of reduction in number of cavities per mold or fewer molds. A fair estimate of the reduction in total cost is given by the following equations:

$$\text{Percent reduction in mold cost} = \frac{\text{Cost of cavities eliminated} + \text{saving in assembly cost}}{\text{Cost of mold with original number of cavities}} \quad \text{(I)}$$

where

$$\text{Saving in assembly cost} = \frac{1}{2}\left(\frac{\text{Number of cavities eliminated}}{\text{Original number of cavities}} \times \text{original assembly cost}\right) \quad \text{(II)}$$

These formulae conservatively assume no saving in cost of mold frame and that assembly cost will be reduced only half as fast as cavity cost.

Results of Formula I applied to information obtained in a typical tool shop are shown in Fig. 1.

Material

Under this heading are included molding compounds and inserts. These two items, in total, represent approximately 42 percent of the average manufacturing cost as shown earlier in this article under "Assumptions regarding plant without dielectric preheat." Savings are anticipated on inserts in unusual cases only; but there should be some savings in plastic compound resulting from the change-over to dielectric preheating. This reasoning is based on the following facts:

a. Larger consumption of compound leads to ordering in more economical quantities.
b. Less resin will be needed to get plasticity.
c. Fewer jobs will require special compounds.
d. Reduction in flash.

Although little quantitative data is available, it is conservatively estimated that total material cost can be reduced approximately 3 percent by the change to dielectric preheating.

Direct labor of pressing

Two different philosophies of press operation are in use. One assigns a single operator to each press; the other gives each operator two or more presses. Each theory has its advantages and no attempt is made here to favor either the one or the other. The distinction is necessary in order to interpret Fig. 2 which illustrates the change in labor per part versus the percent increase in production.

Curves A, B and C represent various conditions with more than one mold per operator. Curve A represents the condition occurring in a multiple press setup with a single operator and no waiting time for cure.

Adding a dielectric preheater to this setup means the operator will have fewer presses to operate. With few

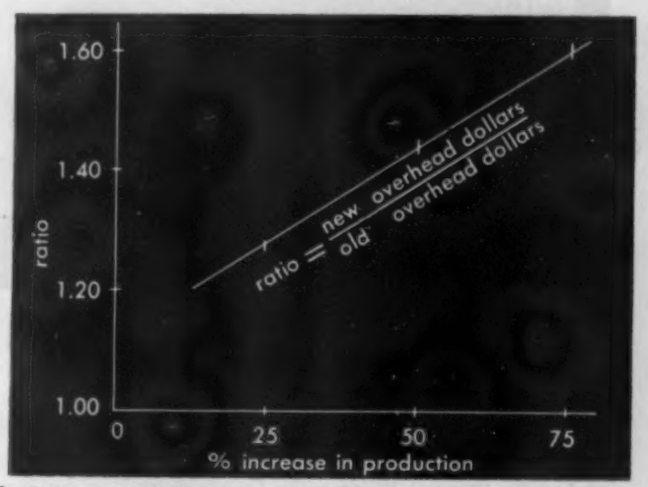
Table I.—Overhead on Pressing Labor: Items Related to Increased Production Rate

P = Proportionality factor which is: New cost = $[1 + \frac{P}{100} \times$ (percent increase in production)$] \times$ old cost

$P = 1/10$	$P = 1/3$	$P = 1/2$	$P = 2/3$	$P = 1$	$P = 4/4$
a. Maintenance of buildings and structures	a. Telephone and telegraph b. Laboratory service	a. Foremen b. Assessments for: 1. Power plant 2. Production control 3. Wage rate 4. Accounting 5. Personnel 6. Order and stores 7. Management	a. Non-durable tools b. Shop and office supplies c. Maintenance of presses and misc. shop equipment (non-electrical) d. Inspection	a. Factory clerks b. Factory service: 1. Helpers and laborers 2. Stock keepers 3. Transportation men 4. Dispensary help 5. Packers c. Overtime, idle time, training, bonus d. Vacation e. Assessment from financial section f. Miscellaneous: 1. Water supply 2. Equipment changes 3. Traveling and entertainment 4. Accident payments 5. Taking inventories 6. Losses due to errors	a. Electric power

exceptions the minimum number is two presses for which a 75 percent average increase in production is obtainable at no added cost in labor per part. Curve B shows a very undesirable increase in labor when the press operator continues to run only two presses for which production cannot be held to the 75 percent average increase in output. Increased labor cost covers waiting time for cure. Curve C was chosen as a fair compromise for this study. Operators will run either two or three presses with some waiting time if necessary.

Curve D, for single press operation, shows a marked decrease in labor per part because increased production subtracts directly from operator waiting time. Had this curve been used as a basis of labor cost for the rest of this study, the cost reduction per part due to dielectric preheating would have been several percents greater.



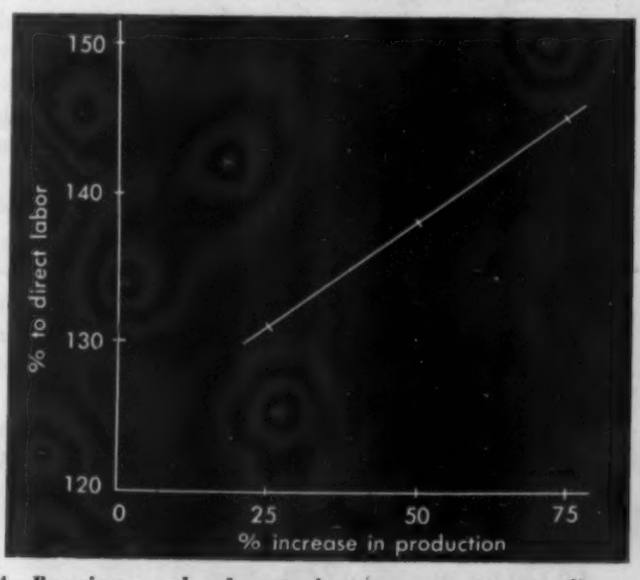
3—Effect of dielectric preheating on pressing overhead

Finishing labor, overhead on pressing

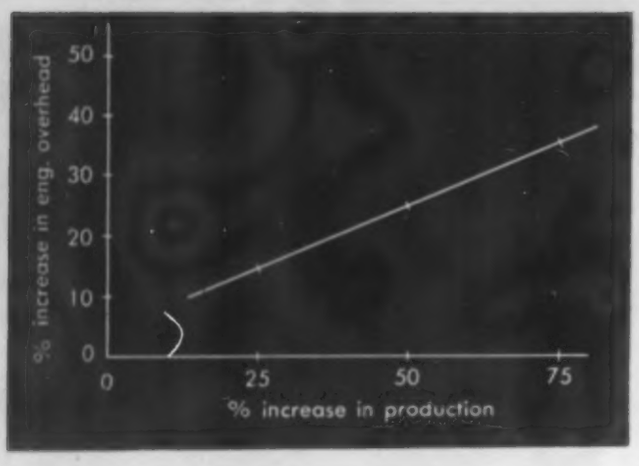
Thinner flash resulting from the use of dielectric preheating allows substitution of punching fixtures or tumbling in place of hand filing. This labor reduction is independent of increased molding rate in the pressroom. For the purpose of this paper, reduction of 15 percent has been assumed for finishing labor.

Factory overhead includes all indirect manufacturing expenses such as supervision, clerical help, service employees, shop supplies, maintenance and various assessments. These items have been divided into two categories; those increased by some factor related to increased rate of production, and those not related to increased rate of production.

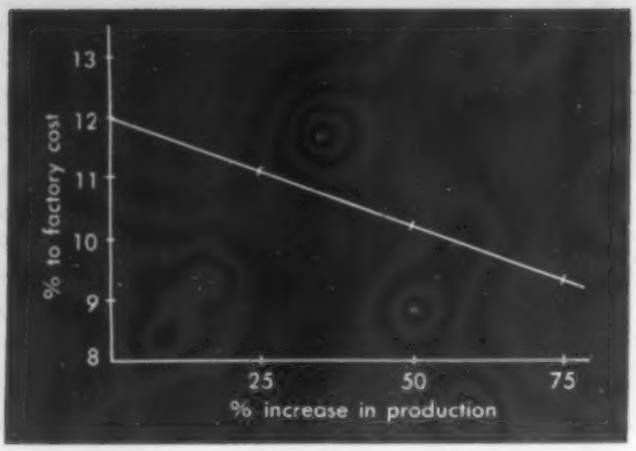
Table I presents information on the relationships of various overhead items to increased rate of production. These items can all be traced back to a combination of more workers and a greater flow of materials. Use of the proportionality factor P is illustrated by taking for example foremen for which P is one-half. If rate of pro-



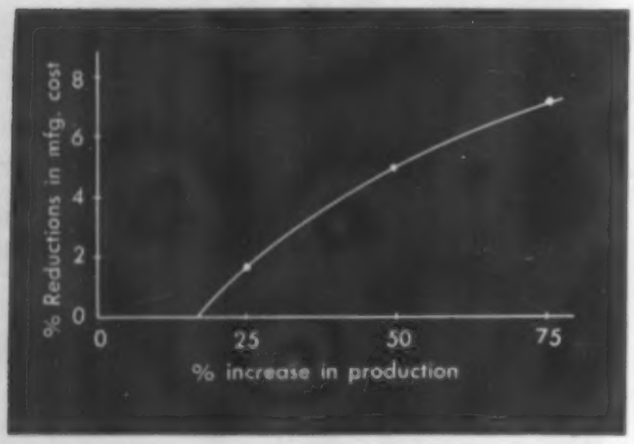
4—Pressing overhead cost given as percentage to direct labor based on dielectric preheat, labor curve C (Fig. 2)



5—Increase in engineering overhead vs. production rate



6—Percentage to factory cost for engineering overhead



7—Manufacturing cost cut due to dielectric preheating

duction increases 50 percent, then number of foremen increases approximately 25 percent. In justification for the 25 percent increase in foremen, it can be reasoned that with approximately 50 percent more press operators (assumed necessary for 50 percent increased production) the original number of foremen would have too many workers per foreman for efficient operation. By increasing the number of foremen 25 percent, each foreman then handles 20 percent more people and 20 percent fewer presses.

Maintenance of presses and miscellaneous nonelectrical shop equipment is shown as increasing by two-thirds of the increased output. This figure recognizes that some maintenance is a function of time rather than usage. If more production can be turned out between servicings, maintenance cost does not increase as fast as increase in production.

The item of electric power is shown as increasing proportionally to four-thirds of the increase in output. This is based on operating an average of two presses per preheater for 20 hr. per day on the following duty cycle:

4.0 kw. for 90 percent of the time

0.4 kw. for 10 percent of the time

The cost of power was calculated at 1.2 cents per kwk.

Overhead items not included in Table I were considered to be independent of increased production rate. The following list includes items which should not change appreciably by the introduction of dielectric preheating.

a. Plant protection.
b. Power plant attendants.
c. Maintenance of general plant facilities.
d. General supervision (the general foreman of the pressroom).

Some overhead items independent of increased production are, nevertheless, increased by use of dielectric preheating. For instance, the total of depreciation, taxes and insurance will increase substantially. Electrical maintenance can be expected to increase several times. The major expense item, tube replacement, is based on a 1500-hr. average life. The second largest item is for maintenance men to service preheaters. Experience shows that with the proper facilities one man per shift can maintain over 50 preheaters. For this analysis, the figure was arbitrarily set at 42 preheaters per man per shift. A third rather minor maintenance item covers miscellaneous replacement parts other than tubes. For purposes of calculation, it is assumed that electrical maintenance will increase some 300 percent.

Overhead comparison

By applying the various proportionality factors to typical overhead items, it should be possible to predict the new overhead expense when dielectric preheating is used throughout. Results of such calculations are shown in Fig. 3. This graph gives the ratio of total dollars of overhead expense versus percentage increase in production. It is interesting to note that on the basis of the arbitrary assumptions used herein, an increase of 32 percent in output just about offsets the increase in overhead expense.

In order to incorporate the overhead expense into

manufacturing cost per part, one method of accounting applies a percentage to the direct labor per part. This percentage is obtained by dividing the total overhead expense by the total direct labor for a given period of time. Results of this calculation are shown in Fig. 4.

Overhead on finishing

Since the direct labor of finishing decreases, the overhead rate on direct labor for finishing would have to be increased to liquidate the same overhead dollars per part. However, enough of the overhead items are relatively independent of increased output so that overhead rate need not be increased appreciably.

Spoilage

All things being equal, one might assume that better cure, thinner flash and easier moldability with dielectric preheat would reduce scrap to a fraction of that formerly obtained. The actual picture is somewhat different. In practice, cure time is cut to a minimum and smaller presses are used. For purposes of calculation, 15 percent reduction in spoilage is assumed.

The total of material, labor and overhead costs is known as factory cost. Spoilage is expressed as a percentage to factory cost and should decrease in proportion to the reduction in spoilage.

Shipping costs

Shipping costs include cost of containers, packing, labor and shipping overhead. Some small saving in shipping costs is anticipated through larger and consolidated single shipments. For purposes of illustration, an arbitrary percentage to factory cost is assumed to be constant with and without dielectric preheating.

Engineering overhead

Engineering overhead expense is liquidated by adding a percentage to the factory cost. Expense items affected by increased rate of production are shown in Table II. In the case of complaints, it is assumed that the expense per part remains unchanged with and without dielectric preheating.

Figure 5 shows the percentage increase in total engineering overhead expense versus the increased production rate. On the basis of this curve, any increase in production over 10 percent more than offsets added engineering expenses. Figure 6 presents the new engineering overhead per part in terms of a percentage to factory cost.

Table II.—Engineering Expenses vs Increased Production

P = Proportionality factor which is: New cost = $[1 + \frac{P}{100} \times$ (percent increase in production)$] \times$ old cost

$P = {}^{20}/_{75}$	$P = {}^{1}/_{2}$	$P = 1$
a. Salaries: engineers, draftsmen, and clerks	a. Mold maintenance	a. Shop work; mold sampling
b. Direct expense: traveling, entertaining, office supplies, etc.	b. Special tool maintenance	b. Engineering molds and special tools; original tools, not billed
c. Indirect expense: pensions, bonus, administrative assessments, etc.		c. Production molds and special tools; duplicate tools, not billed

Table III.—Effect of Dielectric Preheating on Manufacturing Cost

All values are given in percent of original manufacturing cost. Basic assumption: average of two presses per operator, never more than three

Cost item	*Without dielectric preheating*	*With dielectric preheating*		
Production Rate, percent	100	125	150	175
Material	42.0	40.9	40.9	40.9
Press labor	10.0	12.3	11.0	10.0
Finishing labor	7.0	6.0	6.0	6.0
Overhead, pressing	16.0	16.3	15.3	14.6
Overhead, finishing	10.0	9.3	9.3	9.3
Factory cost, Total	85.0	84.8	82.5	80.8
Spoilage	3.0	2.5	2.4	2.4
Shipping	2.0	2.0	2.0	2.0
Overhead, engineering	10.0	9.2	8.4	7.7
Manufacturing cost—Grand Total	100.0	98.5	95.3	92.9

Total manufacturing cost

The effect of dielectric preheating on all components of manufacturing cost is presented by Table III. Figure 7 is a plot of the reduction in manufacturing cost versus increased rate of production. On the basis of previous assumptions, this curve makes it apparent that any increase in production over 17 percent more than pays for the additional cost of operation with dielectric preheating.

Financial significance

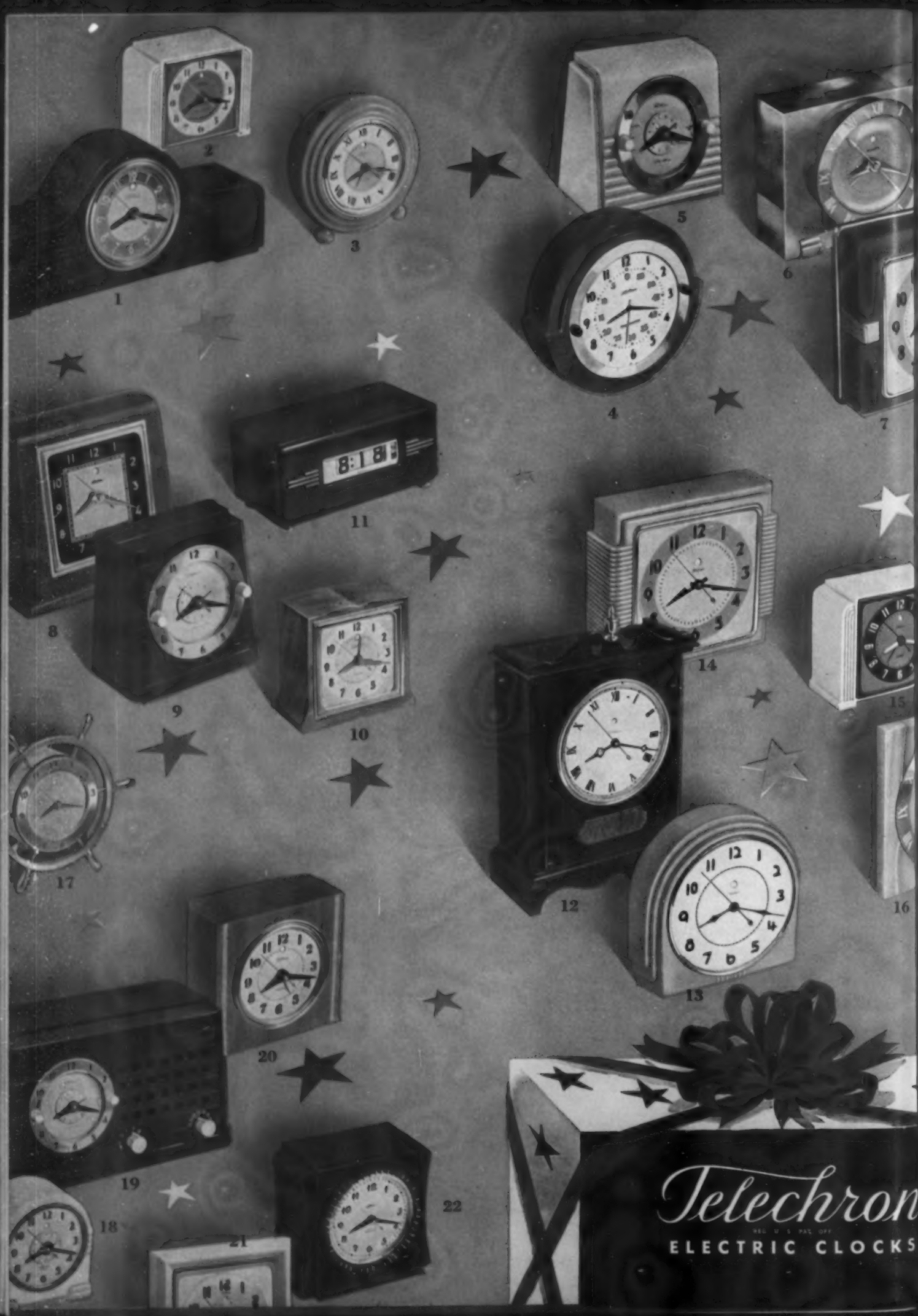
The following inclusions on the financial significance of dielectric preheating are based on the fundamental assumptions which were briefly stated at the beginning of this paper.

Molder's viewpoint:

a. The addition of preheaters enlarges the production capacity of a plant.
b. Any increase in production greater than 17 percent results in a reduction in manufacturing cost.
c. For a production increase of 75 percent, the average manufacturing cost is apparently reduced 7 percent.

Customer's viewpoint:

a. For a production increase of 75 percent, average tool investment on quantity production jobs can apparently be decreased 30 percent.
b. Parts prices should be less because of reduced manufacturing cost per part.


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
Telechron
ELECTRIC CLOCKS



ARE BEAUTIFIED WITH PLASKON MOLDED COLOR CASES!

The rich, sparkling range of Plaskon colors in the new Telechron electric clock line has helped give it great public appeal. There is a Telechron clock for every need—a beautiful utility instrument to grace each room in the home or office.

The wide use of Plaskon Molded Color by Telechron is another example of how this versatile material can help manufacturing and sales programs. Once the product mold is established, large numbers of duplicates can be turned out quickly and economically, each molded article absolutely true and identical with original specifications.

Plaskon molding materials are available in a beautiful range of colors—clean, clear tones that are uniform and unchanging, because they are solid, permanent color through and through. Plaskon Molded Color is warm and friendly to the touch. The gleaming, non-porous surface will not tarnish, check or corrode. Plaskon is strong, shock-resistant, won't chip or shatter.

Plaskon molding compounds have distinctive features that give them widespread application in the electrical, cosmetic, drug, garment and many other fields. We shall be glad to help you adapt the many advantages of these versatile materials to your manufacturing and merchandising needs. Write for free illustrated book showing many applications of Plaskon® products.

*Reg. U.S. Pat. Off.

PLASKON DIVISION • LIBBEY • OWENS • FORD GLASS COMPANY
2121 Sylvan Avenue, Toledo 6, Ohio • In Canada: Canadian Industries Limited, Montreal, P. Q.

PLASKON

TRADE MARK REGISTERED

MOLDED COLOR

Fabricating of cellulose acetate

by R. G. O'KANE*

CELLULOSE acetate is generally supplied in the form of a molding powder for injection molding. But like cellulose nitrate and cellulose acetate butyrate, it is also available in the form of sheets, rods and tubes for fabrication.

Sheets of cellulose acetate generally come in gages from 0.005 to 0.250 inch. Solid sheets are seldom made any thicker than this, but composite sheets sometimes run as high as 0.400 in. in thickness. This article will be confined to a discussion of the processing of sheets running between 0.020 and about 0.150 in. in thickness.

Shipment and storage

Acetate sheets are generally cut and trimmed by the material manufacturer to 20 by 50 in. and packed in either cardboard cartons or wooden cases. These sheets when received by the processor should be maintained at temperatures between 80 and 100° F., and at humidities between 60 and 80 percent. The disadvantage of storage at lower temperatures and lower humidities is that any processing—such as cutting or drilling—is performed under less favorable conditions, and chipping and cracking are more likely to result. Higher temperatures up to 150° C. are of no definite disadvantage, but above this point softening occurs, resulting in distortion or in the development of surface defects. Similarly, higher humidities up to 100 percent, aren't disadvantagous except for moisture condensation.

Cutting of acetate

It is easy to cut acetate with a Seybold cutter, but the material should first be conditioned in a vault or cabinet at 80 to 120° F., with the humidity between 60 and 80 percent. If a Seybold cutter is not available, any high-speed circular or band saw, such as used for cutting cherry or maple wood, can be used. However, feeding sheets against the saw too fast may soften the edges somewhat. It is not necessary to use cooling water because the material is not inflammable.

To trim acetate, the sheets must first be conditioned as described above. Then sheets can be trimmed to curved dimensions with tinner's snips. This is easiest in sheets of 0.060 to 0.105 in. thickness, but is also possible in other thicknesses. Hand finishing around the edges can be done with a milling tool, coarse sandpaper or file sharpened to a 60° edge and used as shaver.

Sewing of acetate sheets

It is possible under certain conditions to sew acetate sheets. Here again the material requires careful conditioning in a vault or cabinet with temperatures maintained between 80 to 120° F. and humidities between 50 and 80 percent. This conditioning must extend over at least an overnight period and sheets must be removed only a few minutes before the actual stitching. The following recommendations are also made: 1) use of a special diamond pointed needle developed for this purpose; 2) somewhat slower machine operation than normal; 3) wider spacing of stitches than normal.

Embossing of acetate

Embossing of acetate can be effected through the use of an embossing die in a toggle press. The upper platen of the toggle press is cored for steam, and the embossing die is heated in this manner to a range of 150 to 250° F.

Embossing of the sheets can be best effected by preheating the sheets to a very soft condition, then loading them quickly into the toggle press and closing the press to develop a pressure of at least 500 p.s.i. (For 20 by 50-in. sheets a 400-ton Sheridan toggle press is used.)

The embossing takes a dwell of between 5 and 60 sec., depending upon the thickness of the material and the depth of the design. Following this short period of time under pressure, the sheet is removed and laid on a flat surface to cool. The embossing is retained perfectly even though the material is removed from the hot die without cooling. The sheets should not be piled on top of each other before being properly cooled. To do so will damage the embossing.

Drilling

In drilling acetate, temperature ranges of 80 to 100° F. with humidity between 60 and 80 percent are most satisfactory. Speed of the drills should be between 1000 r.p.m. for $^1/_2$-in. diameter drills and 2000 r.p.m. for $^1/_8$-in. drills. The drills should be ground to a 60° face for the $^1/_2$-in. in diameter or larger holes and to 120° for the $^1/_8$-in. diameter, graduating this angle as the size holes change from $^1/_8$ to $^1/_2$ inch. Care should be taken to grind a clearance and also to allow plenty of chip space. The flutes should be polished carefully to permit the drill to free itself.

Forming of acetate

To form acetate, it is first necessary to preheat the material by any one of the following methods:

1. Heat the sheets or pieces 5 to 10 min. on a steam or electric hot plate to 180 to 250° F. The sheets must be protected from the hot plate by several thicknesses of cotton cloth. A pad made up of several thicknesses of the same cotton cloth should be superimposed over

* Technical Service Department, Monsanto Chemical Co., Plastics Div., Springfield, Mass.

the piece during the heating period. (The piece under pad should be checked during heating period for plasticity by turning back pad and bending a corner.)

2. Heat in a dry air oven with circulating air between 180 and 250° F. for possibly 10 to 30 minutes.

3. A bath of kerosene or glycerine between 180 and 250° F. may sometimes be used if the immersion can be watched closely and the stock removed instantly when it has softened properly for the next operation.

Following the preheating operation, the forming or bending must be accomplished with an absolute minimum loss of time. This detail is quite important because of the rapid setting of the acetate when exposed to the air during handling between the preheating and the forming equipment. Forming or bending may be performed using either a foot press, a toggle press, a pneumatic press or a hydraulic press.

In these presses a male member, made either of wood or metal, is used to form and set the heated plastic sheet to the desired curvature. The male part of the die fits into the female part which is attached to the lower platen. The female part may merely be a ring of the necessary shape to perform a supporting and cutting off function in this processing step. For more accurate shaping, the male and female portions of the die should be made exactly to size with a clearance equal to the thickness of the plastic sheet to be processed.

In order to protect the plastic surface from scratches during pressing, it has been found practical in certain cases to use wooden molds covered with canton flannel, particularly where there is to be limited production of a special shape. A more practical method of avoiding scratches is to have die highly polished, chrome plated.

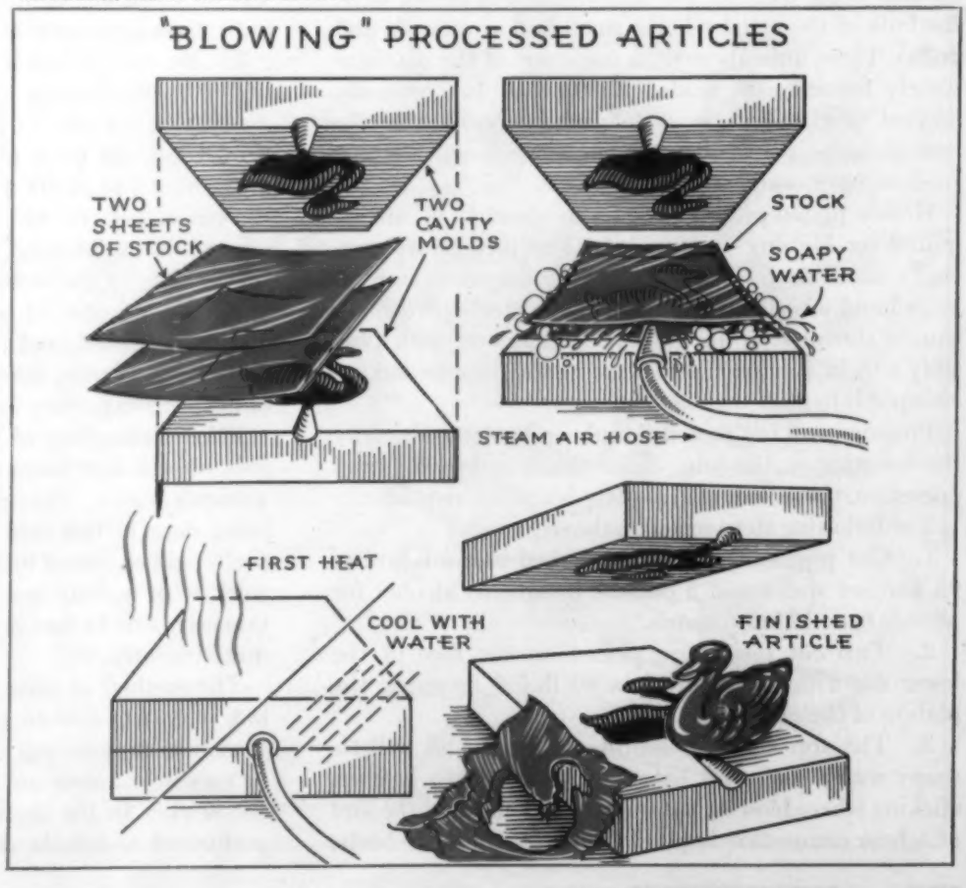
In certain instances it has been found advantageous to prepare two metal pieces to the exact shape of the desired molded plastic, holding them together by an arrangement of springs so that they may be separated or opened to permit the insertion of the flat plastic piece. The spring tension is then released to put pressure on the plastic. This assembly may be immersed in kerosene or glycerine at a temperature ranging between 200 and 250° F., removed after a few seconds and immediately immersed in cold water. If the temperature of the kerosene or glycerine is properly controlled, it is possible by this method to shape pieces by merely immersing in the hot bath for an instant and removing and immersing in the cold bath to set the piece to its new shape. This technique, of course, can only be applied to relatively small pieces with simple curvatures. This processing has also been found to work equally well with the clamp arrangement when the plastic insertion is loaded into an oven with circulating air at 200 to 250° F. In this case, after the proper time under heat, the assembly is cooled in the air at room temperature.

Detailed fabrication processes

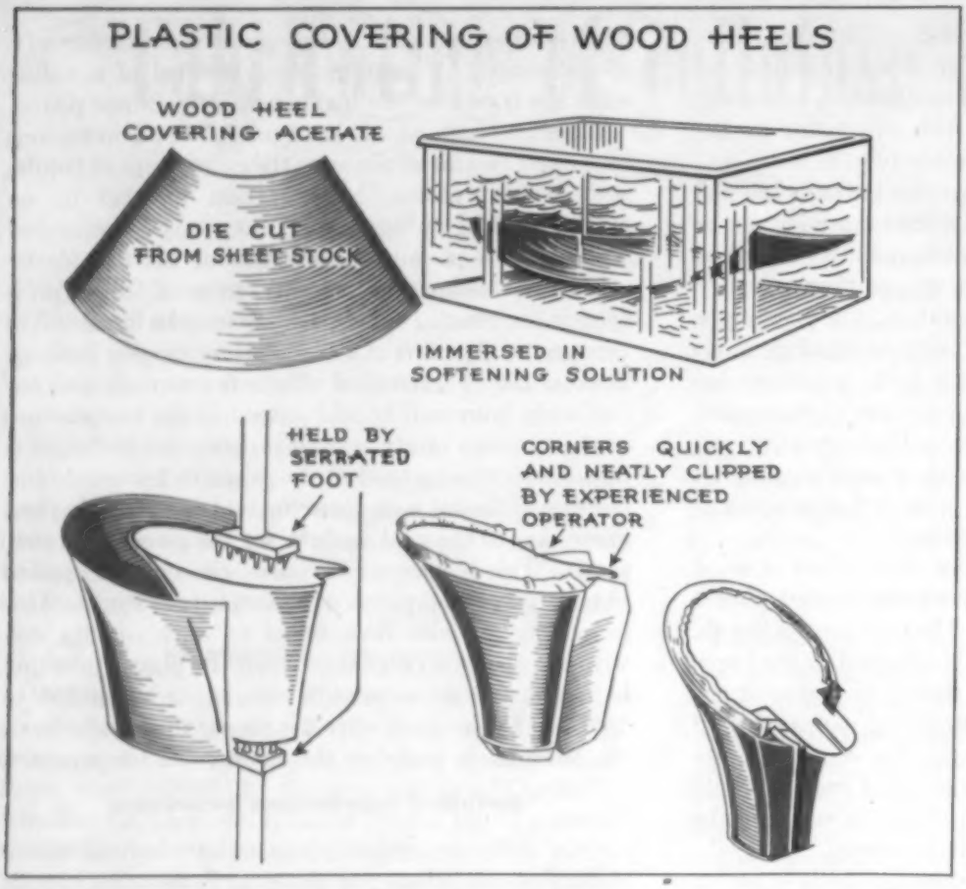
Over the years, certain processes have become standardized in the industry as the way of producing specific items. Seven of these methods are presented here:

Blowing processed articles — Blowing stock

ALL DRAWINGS, COURTESY MONSANTO CHEMICAL CO.



Steps in blowing processed articles are sketched here. Hollow platen presses, opening to 12 in., are required and skill of operator determines quality of goods. Stock is supplied in 0.010, 0.015 and 0.020 in. thicknesses



In the covering of wooden heels with cellulose acetate, again the skill of the operator is a prime requisite. Covers are immersed in a softening solution from 10 to 30 min. before being wiped and cemented to the heel

has been supplied the trade for years in 0.010, 0.015, 0.020 in. thicknesses. The major portion of this material is being used for the manufacture of blown toys, the bulk of the articles being small hollow animals and dolls. These animals or dolls come out of the die completely formed and welded together at the centrally located seam. This is particularly important in the case of ducks, swans and other toys which are designed for floating on water.

Hollow platen presses opening to about 12 in. are required for blowing operations. (The presses are generally about 24 by 24 inches.) The operation is by a large hand wheel about 24 in. in diameter, operating a square thread stud about 2 in. in diameter with possibly a $^1/_2$ in. pitch. The dies are usually bronze and are clamped into place on hollow platens.

Pressures are not recorded and can be determined by the operator on the job. Since this is a delicate hand operation, the skill of the operator is a prime requisite.

The following steps make up the sequence:

1. Cut pieces of plastic are soaked in a mixture of 95 percent water and 5 percent denatured alcohol for periods from 12 hr. upwards.

2. Two cut pieces are placed on the face of the lower die with heat turned to 60 lb. of steam on the platens of the press.

3. The top sheet of acetate is lifted and a little soapy water is sloshed between the sheets to prevent sticking where blowing is desired. A nozzle on the end of a hose connection is placed between edges of sheets.

4. The die is closed gently and, after about 1 min., steam is gradually fed through the hose and nozzle., The die closure is tightened over a period of 2 to 3 min. until steam pressure is brought up to 4 pounds.

5. By manipulation of steam and air valves connected to the nozzle, steam is gradually replaced by air up to a pressure of 20 pounds. Cold water is then turned into the press platens. The cold water hose is also swung into position to run over the exposed area of the outside of the die. The pressure is gradually increased by tightening down the hand wheel during the first part of the cooling.

6. After 3 min. of cooling, the air is shut off, hose and press opened, and the blown set removed. Immediately afterwards, the steam is turned on the platens of the press to prepare for the next blowing cycle.

Plastic covering of wood heels — For years cellulose nitrate has been used to cover wood heels for women's shoes. However, considerable work is now being done in this field with cellulose acetate which is preferred because of its nonflammable qualities. While work with acetate was first introduced in 1935, certain economic factors prevented its widespread use until quite recently.

The method of processing can be described briefly, but it is desirable to point out that the following of these instructions will not necessarily produce a satisfactory job unless an experienced operator performs the work. In the shops where wood heel covering is performed a definite difference in the quality of the

work performed by the various operators can be observed, even though many of the men have been working for periods of from 5 to 20 years on this one job. It should be emphasized that natural dexterity is more important than any other detail in securing uniform and satisfactory results in covering heels. The steps of the operation are:

1. Covers are cut from standard 20 by 50 in. cellulose acetate sheets. Thicknesses of from 0.010 to 0.025 in. are used for these covers; the heavier material being embossed with alligator or other deep embossed designs that the 0.010 in. thickness will not hold.

2. Covers are immersed in a softening solution (which may be prepared from a number of solvents) for periods varying from 10 to 30 min., until the material becomes quite flexible. The necessary flexibility may be best described as a complete loss of stiffness.

3. Usually 24 to 48 pieces are softened at a time. These softened covers are taken out of the softening solution and laid on the workbench between damp cloths alongside the operator. At this stage, the wood heel is clamped quickly into position in standard clamps provided for this purpose and the curved surface quickly coated with a special cement. The clamp is designed to support the heel on the top and bottom and permits free covering of the curved surface. The cement is best applied with a small bristle brush.

4. A softened cover is then quickly removed from the pile under the wet cloth, dried off with a piece of soft dry cloth and then stretched over the wood heel.

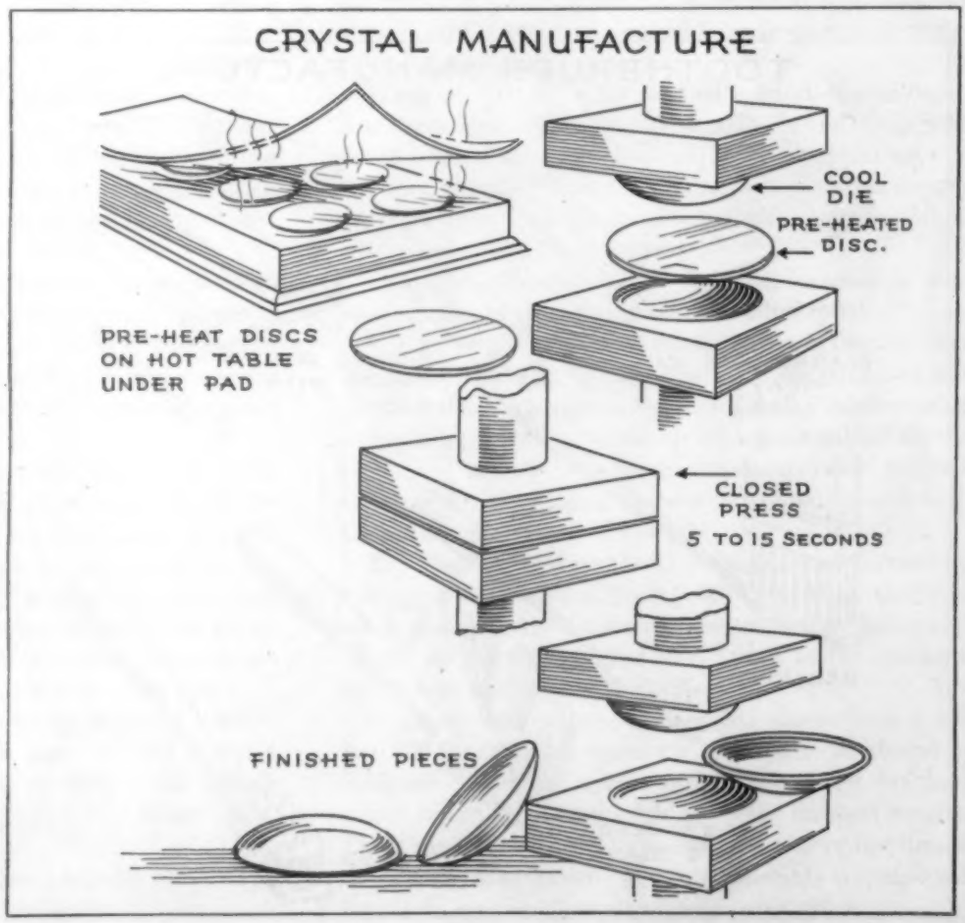
5. The covered heel is quickly removed from the clamp, the corners are clipped with a pair of scissors to permit a neat job of lapping, a little cement is applied to the heel with the bristle brush and the lapovers are brought quickly into position.

6. In order to obtain *kid* or other embossed effects, the covers (after being properly softened as described above) are loaded into a press and embossed with designs. This method is called the *kantscuff* and consists of a simple book-type press in which rubber pads force the plastic sheets against steel dies with a fixed tie interval and a fixed pressure to permanently set the design into the surface of the plastic. Following this, the pieces are stripped off the plates and quickly stretched onto the heels by the methods described in paragraphs numbered 3, 4 and 5 on this page.

Covering hamper tops, toilet seats—Cellulose nitrate has been used for years in this field, but cellulose acetate is as satisfactory a cover and has been introduced to several processors who are currently using the material in increasing amounts. As a general rule, 0.010 in. thick material is used. The details of covering include:

1. Sand the wood to be covered. Remember that all irregularities tend to show through the covered material.

2. Brush over the wood a coat of the cement recommended by the raw materials supplier. This cement



Disks must be preheated to about 250° F. before being used in the manufacture of watch and radio crystals. Softened disks are then loaded into cold die and held for 5 to 15 seconds. Various steps in process are shown here

generally may be stained to the approximate color of the sheeting if necessary.

3. Cut the cellulose acetate sheet a little oversize and dip in a softening solution of solvent. When the sheet is thoroughly limp, it should be removed from the softening solution and wiped with dry cloths.

4. The primed hamper cover should be given a second coat of cement and the softened cellulose acetate sheet applied while the cement is still tacky. Smooth out the sheet and free it of air bubbles. It is best to apply the flat side first.

5. Press the assembly in a book press with a piece of 1 or $1^1/_2$-in. thick sponge rubber against the cellulose acetate sheet and a plate (not quite as large as the cover) under the cover. Allow this setup to dry overnight and then trim and smooth the edges.

6. Apply a freshly softened sheet of cellulose acetate to the curved side of the board in the same manner as the flat side, except that the assembly should be taken from the press after 1 or 2 min. and the stretching finished by hand. A little cement should be brushed along the edges as they are turned down so that good adhesion to the edges of the flat side is obtained.

Watch and radio crystal manufacture—Sheet stock should be at 80 to 100° F. for this work. The stock, in 0.020 to 0.060 in. gages, is cut into strips and later into disks or rectangles according to the shape of the finished crystal desired.

1. The disks are preheated, using either electric or steam heat, with a hot plate (the body about 12 by 18 in. or larger) maintained at about 250° F. Six to 12 sheets of tissue paper are laid on top of the heating plates and a number of disks of cellulose acetate laid flat on top of the tissue. Over each disk is placed a small cardboard box to prevent loss of heat from the top of the disk during the heating period. With the proper heat, it should be possible to heat these disks to a plastic state without loss of the polished finish on either side. This is a rather difficult operation which the operator will have to learn by trial.

2. These heated and softened pieces are then loaded into a cold die which is closed and held for from 5 to 15 sec. dwell. This time is determined by an examination of the finished pieces for quality. (The movement of the pieces from hot plate to cold die must be rapid.)

3. The number of pieces that should be kept heated ahead of the die may run from five to ten. This is something that the operator will have to determine by trial and error in order to get the pieces hot enough to mold and still not overheat and lose polished surface.

Dies for hobbing of watch and radio crystals are usually made with a complete male or hub member shaped exactly like the finished piece. This hub operates into a female member which consists, essentially, of a steel block with an aperture cut to the size of the male member and a stripper plate to hold the stock tightly against the face of the male block during the final fractional closure of the die. In this way, the softened sheet of plastic stock is pulled tightly against the male member without the necessity of using an ex-



In the manufacture of various types of brushes, cellulose acetate, in 6 by 20 in. strips, are fed to cutter for shaping out the blanks. These blanks are loaded into dies and molded into the desired shape under high pressure

pensive female member which would fit accurately against the male member with the proper clearance. Clearances of these dies are extremely important. Only a few thousandths more than the actual thickness of stock can be tolerated if a high inspection yield from the finished pieces is to be obtained.

Toothbrush, hairbrush manufacture—The following details cover the manufacture of toothbrush, nail, complexion brush, hairbrush handles:

1. Cellulose acetate is used by toothbrush handle manufacturers in thicknesses varying from 0.200 to 0.250 inch. Sheets are cut into approximately 6 by 20 in. strips which are then fed into a cutter for shaping out the blanks. These blanks are tumbled in a pumice-and-water mixture for 12 to 24 hr., until the edges have been well rounded. The blanks are washed and dried thoroughly, then dipped into a special solvent mixture to apply a polish to the surface. After a suitable drying period, the blanks are heated in an oven for 10 to 15 min. at a temperature of about 200° F. After this, they are loaded into closed dies and molded into desired toothbrush handle shapes under high pressure. The die cycle is not more than 5 or 10 seconds. Following the molding operation, the toothbrush handles are drilled and bristled in automatic machines of a special design usually worked out by each manufacturer.

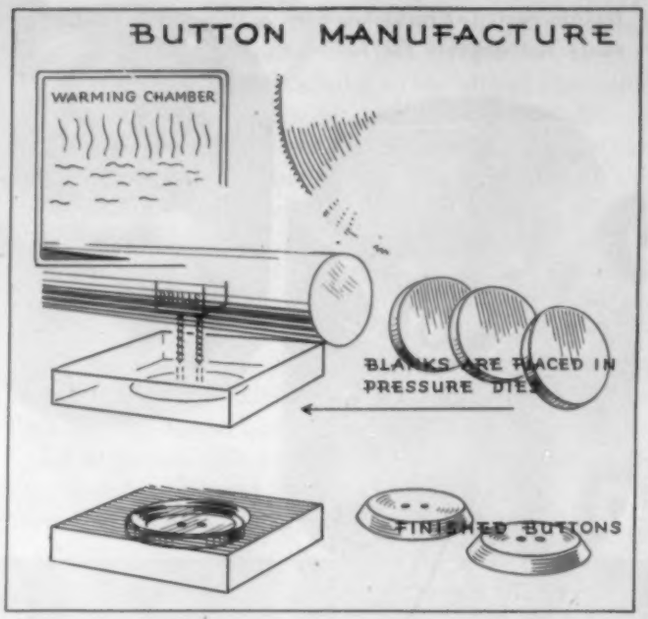
2. Thicker cellulose acetate sheeting, running up to $^1/_2$ in. in thickness, is cut into blocks which are tumbled in pumice and water, drilled and bristled for use as nail brushes and complexion brushes.

3. Hairbrushes are sometimes made from extruded cellulose acetate rod. The extruded shape is such that with a simple shaping operation an approximate hairbrush block is produced. This block is dipped into a special solvent mixture to produce a polished surface, heated (as are toothbrush blanks) and molded into the finished shape in the same manner as the toothbrush blanks. Later, the molded hairbrush backs are drilled and bristled using automatic machinery.

Button, novelty, umbrella handle manufacture—Cellulose acetate rods in diameters from $^1/_2$ in. up to $1^1/_2$ in., and sheets in thicknesses from 0.020 through 0.300 in. are used for buttons, bag frames and umbrella handles, and for numerous other ornamental purposes in ladies' accessories.

For buttons, the rods are heated—usually in water about boiling temperature—and sliced into disks of the proper thickness. In cases where sheet stock is used, the disks are cut from sheets of the desired thickness. These disks are heated again by another operator, usually on a hot plate (a hollow platen heated by steam to about 200° F.). The stock is protected from direct heat by several thicknesses of paper or cloth and covered with a similar type of insulating material. When the pieces are properly heated, they are fed under a stamping die which shapes the surface of the button into the desired shape and punches the necessary number of holes in the same operation.

For handbag frames, $^1/_2$-in. rod is usually used. The rod is first run through a guide under a saw which grooves out a recess (which is later used to accommodate the edge of the handbag proper during the assembling operation). The rod is heated and bent to the desired shape. Hinges are inserted into the ends by merely forcing metal points into the end of the heated plastic pieces. The catch is cemented in place with suitable cement and pressure is applied for a few seconds to develop a satisfactory bond.



Cellulose acetate rods are often used for buttons, bag frames, umbrella handles. Carving is done with cutters

Many of the parts for umbrella handles and handbag manufacture are engraved with flower designs or other attractive markings to improve the appearance of the final articles. This carving and engraving is simply done by skilled operators manipulating plastic against cutters revolving at high speeds.

Cutlery manufacture—Cellulose acetate is used in a number of ways in the cutlery industry:

1. Sheet stock in 0.010 in. thickness is formed over the metal shank of pen knives by preheating the cut pieces and folding around the metal shell. After cooling at room temperature, these shells are assembled on the knife and present an appearance comparable to that achieved by assembling heavier flat plastic pieces with the standard three rivet assembly.

2. The standard pen knife assembly is performed by riveting a plastic piece (from 0.040 to 0.100 in. thick) in three places to the frame of the pen knife. After riveting, the plastic is buffed to conform to the contours of the caps and ends of the knife.

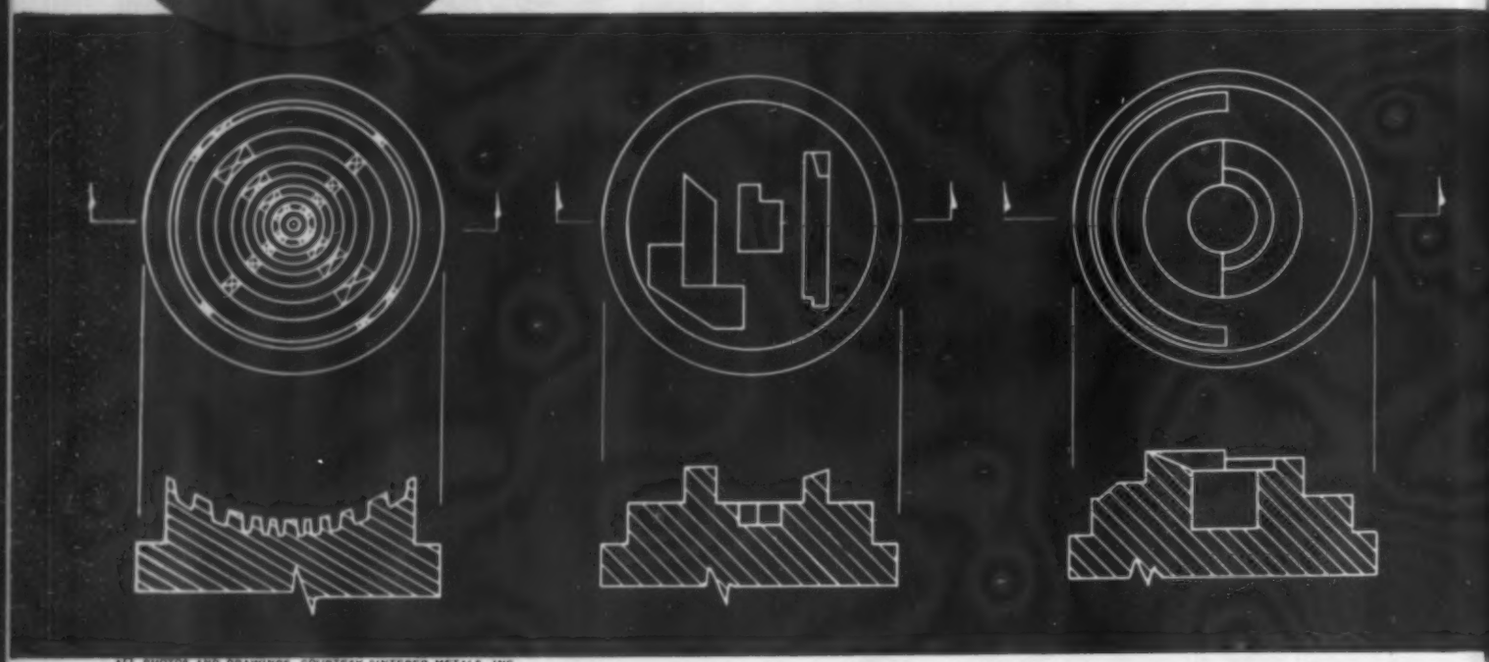
3. For table cutlery, composited sheets from 0.400 to 0.600 in. thick are usually assembled or combined to form an attractive appearance. These are cut into pieces of the approximate shape of the finished handle. These pieces are drilled in one end to receive the tine of the knife, fork or spoon. After the assembly is completed the pieces are put through a finishing operation.

If hobbed, spots in dice cavity at left, would probably tear. Button cavity at right has contours too delicate for hobbing



SINTERED metal cavities

Cavities difficult and costly to hob or machine can be made by pressing metal powder over hob held in die and baking



ALL PHOTOS AND DRAWINGS, COURTESY SINTERED METALS, INC.

Typical examples of cavities formed from sintered metal which would be difficult or expensive to hob

THERE are many ways of producing cavities for plastics molds, by hobbing, machining or casting, for example—methods that have been described in MODERN PLASTICS magazine in past issues. Now, Sintered Metals, Inc., has released details on a new technique for forming cavities of this type from sintered metal. The procedure is fundamentally the same as is used in all metallurgy work except for the greater care and control that must be exercised in all operational steps. Making no claims that better cavities can be produced in this way than by hobbing or machining, the company does say it can produce economically certain designs impossible to hob and costly to machine.

The technique is really an outgrowth of work done with sintered steel powder in the manufacture of radar parts. The close tolerances achieved on these war products, and certain other qualities of the steel powder, convinced the company that this metal could be used in the production of plastics mold cavities. However, two years of experimental work were necessary before satisfactory cavities were produced. Experiments with different pressing methods, pressures and metallic powders had to be carried out, and solutions found to problems relating to cavity surface and core hardness before the company was able to produce very intricate cavities within the required dimensional tolerances. Today, cavities suitable for injection, compression or transfer molding are being turned out.

The process step by step

A prerequisite of this method of making cavities for plastics molding is the fashioning of a hob of the de-

sired design. This hob, with a shank of the required insert diameter, is placed in a bull ring or die. Metallic powders, dry-mixed in the proper proportions, are loaded on top of the hob. This assembly, complete with adjustable spacers to control the ratio of pressure over the hob face, is then pressed in a hydraulic unit. The pressures vary between 30 and 90 tons per sq. in., depending on the design to be reproduced and the powders used.

The selection of the metallic powders is governed principally by the design characteristics of the hob. There are many different metallic powders available for this work, differing widely in grain size, flow qualities and heat treating characteristics—factors which all have a bearing on the success of the finished cavity.

The pressing of the metallic powders within the confines of the bull ring, the hob and the punch causes a "wringing" action of one powder particle against another. The action is similar to the atomic attraction obtained when two gage blocks are "wrung" together. This "wringing" results in a "green compact" having an outside diameter equal to the inside diameter of the bull ring and an impression of the design of the hob at one end.

To achieve the hardness necessary for plastics molding, the "green compact" is sintered or baked in a controlled atmosphere furnace at a temperature below the melting point of the metallic powder. Temperatures are usually about 2300° F. and the length of time the cavities are baked approximates 1 hr. per in. of compact thickness. This baking has been found to reduce the metal oxides and to cause further adherence of the powder particles.

After cooling in the air, the compact is coined or repressed, an operation made necessary by the fact that the sintering or baking causes the compact to shrink. The coining, besides resizing the compact, gives the cavity a surface finish equal to that of the hob.

It is possible to case harden these sintered cavities to a depth of about 0.030 in. so that the case will show a Rockwell hardness of from 58 to 60 on the C scale, while the core registers about 28 to 30 on the C scale. Design has a considerable effect on the ultimate hardness of both core and surface.

In the production of cavities by this method, the powder is pressed equally on both sides of the design sections on the hob. There is, in consequence, little, if any, flow of powder which might tend to fracture fragile portions of the hob. For this reason, designs that have unequal surfaces, raised points that are unequally spaced, off-center or unbalanced areas and thin sections at the outer limits can be successfully reproduced many times with little danger of hob breakage.



Sintering metal cavities can turn out artistic as well as mechanical work as is illustrated by the graceful rose design above



The composition of the metallic powder used for sintered metal molds depends on the design. Here powders are being mixed and pressed to conform to the pattern on the hob

Color photograph, courtesy The Formica Insulation Company, Cincinnati, Ohio



FOR DISTINGUISHED BEAUTY . . .

MELMAC

Whether it's a shining tabletop in restaurant or bar . . . gleaming wall in hotel or ship . . . colorful panel in home or office . . . or kick-proof panel in a taxicab . . . a MELMAC plastic laminated surface has long-lasting beauty — plus utility.

Such laminated surfaces as those shown above, made with Cyanamid's MELMAC laminating resins by The Formica Insulation Company, are both decorative and durable. Surfaces are highly

resistant to abrasion and marring; will not support combustion and can be made cigarette-proof; they are unaffected by alcohol or common solvents. Color and gloss are permanent.

Industrial MELMAC resin laminates with paper, canvas or asbestos fillers provide unusual resistance to wear, will not support combustion, and offer high electrical arc resistance under dry or humid conditions. For this reason, they increase the safety factor when used as insulating materials on high voltage equipment.

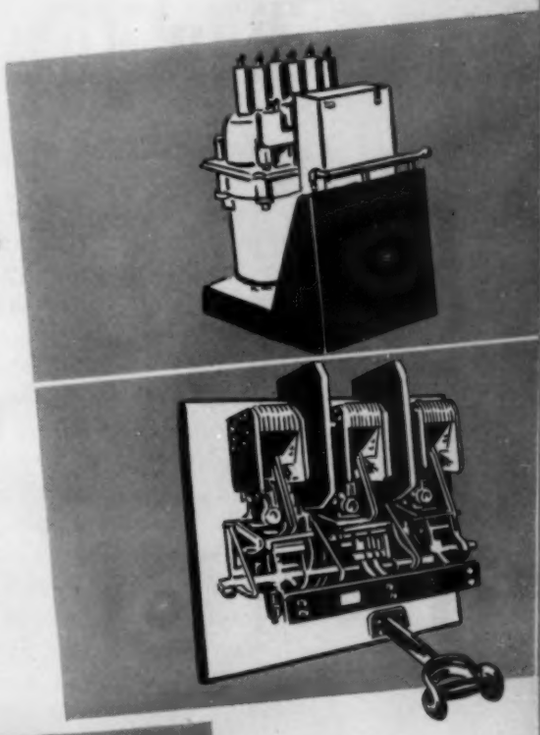
Inquire about MELMAC laminates from your regular laminating materials supplier.

Complete information on MELMAC laminating resins is available from Plastics Division, American Cyanamid Company, 32 Rockefeller Plaza, New York 20, N. Y.

LAMINATING RESINS

. . . FOR INDUSTRIAL DUTY

MELMAC laminates for industrial uses . . . such as insulation pieces on manual or automatic breakers . . . provide unusual resistance to fire, heat, and arcing; and withstand repeated impact and vibration.



CYANAMID PLASTICS

BEETLE* plastics—urea-formaldehyde thermosetting molding compounds

MELMAC* plastics—melamine-formaldehyde thermosetting molding compounds, industrial and laminating resins

URAC* resins—urea-formaldehyde thermosetting industrial resins and adhesives

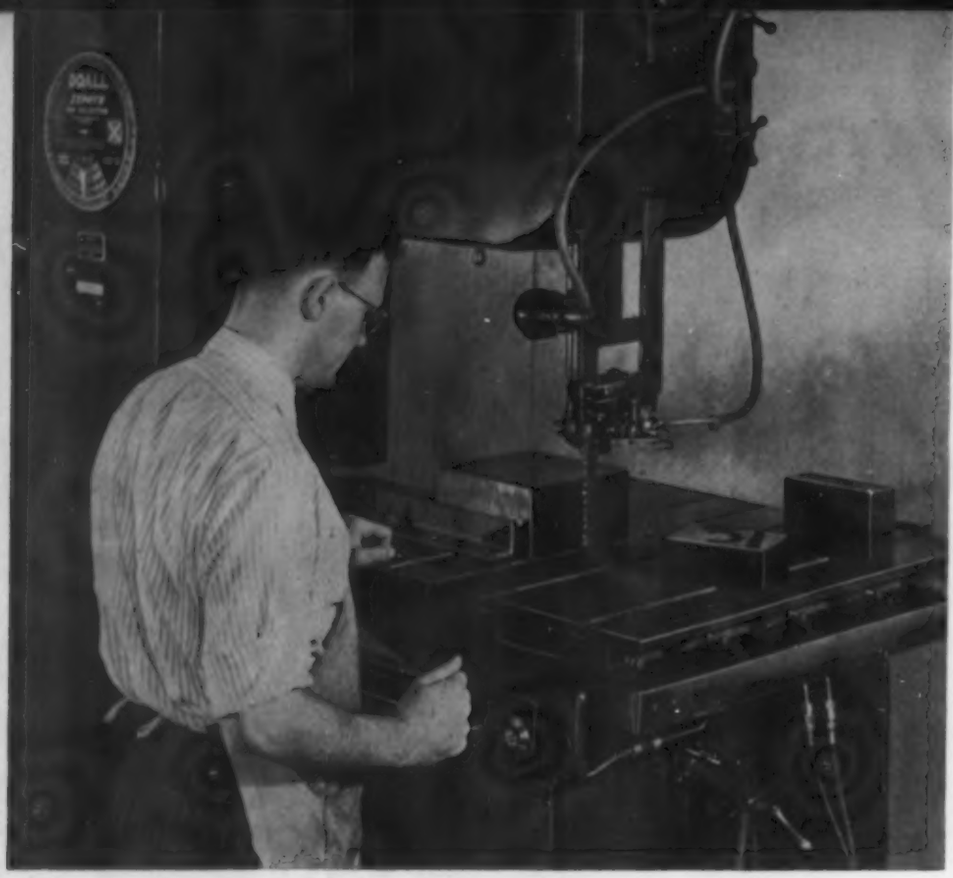
MELURAC* resins—melamine-urea-formaldehyde thermosetting resin adhesives and laminating resins

LAMINAC* resins—thermosetting polyester resins

PHENAC* resins—phenol modified resorcinol thermosetting resin adhesives

*Reg. U. S. Pat. Off.

Cyanamid Plastics



Sawing of 4-in. thick vinylidene chloride can be accomplished at a rate of 1800 r.p.m.'s with a ½-in. three-pitch Buttress type saw, like the one shown. In cutting pieces of vinylidene chloride which measure less than 3 in. in thickness, it is possible to use a standard pitch saw, the pitch and speed of operation varying with the thickness of the material

How to saw vinylidene chloride

by H. J. CHAMBERLAND

LIKE every plastic material, Saran has its own peculiar characteristics which affect the way in which it can be sawed—the type of saw, the speed with which saw can be operated and manner of handling.

While either a saw of standard or Buttress tooth construction can be used and while speeds may vary from a minimum of 1200 to a maximum of 2500 ft. per min., the selection of the correct saw and the speed of its operation for any particular Saran job depends primarily on the thickness of the material being cut.

A $^1/_2$-in. saw band performs efficiently on any thickness for straight cutting or for contouring any radius not exceeding $2^1/_2$ inches. Otherwise the saw width is consistent with the dimension of the radius or contour.

Black or opaque Saran B-115 when under 3 in. in thickness responds very well to a 16-pitch standard saw at 2000 ft. per min. velocity. If the material is under $1^1/_2$ in. in thickness, a 10-pitch saw may also be used by increasing the speed to 2500 ft. per minute. In contrast, when vinylidene chloride is over 3 in. thick the velocity range should be from 1200 to 2000 ft. per min., decreasing in steps of 200 ft. per min. as thickness increases. The saws should have raker set of 0.042 inch.

While the standard-type saw can be used for thicknesses over 3 in., the Buttress or so-called special pitch saw is preferable for this work since it will substantially increase former cutting rates. This type saw is available with a 0.065-in. set which makes it amply free cutting and it possesses but three teeth per inch as compared to six in standard pitch saws.

Feeding pressure should be from light to light-medium, depending on the thickness of the Saran and the degree of finish desired. Should a thin skin develop as the saw breaks through the cut, the condition can be remedied by tilting the table backwards about 5 degrees.

For all this work a dependable coolant is most essential in order to dissipate the heat generated by the sawing action. One excellent coolant consists of 1 part sulfurized oil to about 18 parts of water with a flow volume of $^1/_4$ pint per min. directed uniformly on the saw teeth.

The cutting of Saran tubing differs radically from the cutting of slabs of this material—all the saw control factors being quite standardized for diameters ranging from $^1/_2$ to 4 in. without regard for wall thickness. It is important, however, that the tubing be maintained at close to room temperature (65 to 70° F.) prior to cutting. Most tubing of this type will cut well with a $^1/_2$-in. 10-pitch standard saw at a velocity of from 1250 to 1500 ft. per minute.

Cutting time varies from about 0.03 min. per cut on $^1/_2$-in. tubing to 0.12 min. per cut on 4-in. stock. A rate of 20 to 25 sq. in. per min. on 3-in. tube is average.

Housing Problem Solved

A TWO-PIECE housing molded of shatterproof Tenite encloses the motor of this versatile electric tool. The Tenite keeps dirt out, protects against sudden blows, and adds eye appeal.

Low in heat conductivity, Tenite is always pleasant to the touch and thus contributes to the operator's comfort. Tenite is lightweight and noncorrosive, and is unaffected by perspiration and oil.

Because Tenite can be molded to close tolerances and is dimensionally stable, the two halves of the housing can be molded with positioning pins and corresponding holes.

The lustrous surface of the housing is permanent, and the color will not wear off, since it goes all the way through the material. Tenite can be supplied in any color—transparent, translucent, opaque, or variegated.

If you have a product for which you believe Tenite might be used, write to TENNESSEE EASTMAN CORPORATION (Subsidiary of the Eastman Kodak Company), KINGSPORT, TENNESSEE.



Electri-Craft power tool manufactured by Casco Products Corporation

TENITE AN EASTMAN PLASTIC

Quality stayed HIGH, but Costs came DOWN when G. E. used a

Claremont Cotton Filler

for this application!



PART SHOWN:
Shell and body of hospital button, transfer-molded by Plastics Divisions of General Electric Company for Connecticut Telephone & Electric Company.

General Electric first molded this intricate two-piece housing with a rag filled compound. G-E Product Engineers found, however, that a Claremont cotton flock filler produced moldings meeting the impact strength requirements of the application at *reduced* material costs. Quality stayed high but costs came down when G. E. used Claremont cotton flock.

Formulations compounded with Claremont cotton fillers make for speed and ease in molding, too. All Claremont fillers (available in four types: flock, thread, macerated fabric and cord) are carefully graded, uniform in size and processed to your individual needs. Whatever the strength requirements of your moldings, there is a Claremont filler that will meet — and exceed — your specifications. Samples for laboratory test runs available upon request. Inquiries invited.

CLAREMONT
FLOCK
THREAD
FABRIC
CORD

THE FILLER IS THE HEART

CLAREMONT

WASTE MANUFACTURING CO., CLAREMONT, NEW HAMPSHIRE

"The Country's Largest Manufacturer of Flock"

Flameproofing of cotton fillers in plastic laminates

by SIMON WILLIAMS, JOHN B. ALFERS and CARL M. FURGASON*

The research reported in this paper was conducted by the Research Division, National Cotton Council of America, under contract to the Research and Standards Branch of the Bureau of Ships. Testing of treated materials performed by the National Cotton Council was supplemented by a test program at the Materials Laboratory, U. S. Naval Shipyard, Brooklyn, N. Y. The final analysis and evaluation of the test results were conducted jointly by the Research and Standards Branch of the Bureau of Ships, in Washington, D. C., and by the National Cotton Council. The opinions or assertions contained herein are the private ones of the writers and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

AN important feature of shipboard equipment is reliability and service continuity within the limits of space and weight available in a ship design. Since space is definitely limited, fires are a very serious hazard to continuous service. These factors demand that every possible measure be taken to avoid the use of flammable materials and components in shipboard equipment.

During the war there were several cases of fires originating from electric arcs or other causes being propagated by conventional cellulose-filled molded and laminated insulation. Such instances caused extensive study of other than cellulose materials, and the possibility of improving present materials, on which much information is available concerning their properties, fabrication and application.

Despite the technical advances made during the war in the substitution of non-cellulosic fillers in electrical insulations, the problem of production and procurement of these new types of laminates, i.e., glass-filled melamine laminates, remained sufficiently critical to justify an attempt to improve the properties of cellulose fillers with respect to flame- and glowproofing.

The basic objective of this research was to determine the practicability of incorporating flameproofing compounds with cotton fillers in plastic laminates to reduce the flammability and after-glow properties of the final product while retaining the desirable properties of the original laminate.

Materials tested

Cotton base:

Fabric—48 by 44 in. sheeting; 2.50 yd./lb. based on 40-in. width; unbleached; impregnated in the sized condition.

Web—Produced from $1^1/_{16}$ in. Middling White Bobshaw No. 1 cotton, in a manner previously described.[1]

Resins:

Bakelite BV1112, a cresol-formaldehyde resin.
Melmac 402, a melamine-formaldehyde resin.
Laminac, a low-pressure resin.

Salts:

The salts listed in Table I were selected on the basis of previous research reported in the voluminous literature on the flameproofing of textiles.

Methods of test

The tests of ignition time,[2] burning time,[2] water ab-

* Fabric Research Laboratories, Inc., Boston, Mass.; Navy Department, Bureau of Ships, Washington, D. C.; and Cal-A-Por Co., Houston, Texas, respectively.

[1] "Non-woven cotton webs in laminates," by S. Williams, E. V. Painter and C. M. Furgason, MODERN PLASTICS 24, 153–159, 202, 204, 206 (Sept. 1946).
[2] "Flame resistance of thermosetting plastics," by J. A. Gale, R. W. Stewart and J. B. Alfers, A.S.T.M. Bulletin No. 131, 23 (Dec. 1944).

sorption, dielectric strength, bonding strength and tensile strength were conducted at the Navy Materials Laboratory in accordance with the methods outlined in Joint Army-Navy Specification JAN-P-13.

Observation of after-glow was made following the burning of a specimen for 15 sec. by an oxy-acetylene torch adjusted to give a $^3/_4$ to $1^1/_4$ in. blue cone (flame temperature listed at 3500° C. by the Handbook of Chemistry and Physics, 1942 Edition), extinguishing the flame and dousing the hot portion of the specimen with oxygen.

Impact and flexural strength tests were conducted by the Johns Hopkins University Laboratory in accordance with A.S.T.M. standard methods.

Power factor measurements were made by the National Cotton Council Laboratory in accordance with A.S.T.M. (JAN-P-13) method using 4-in. square specimens completely covered on one side with tin foil and with a 3-in. disk of tin foil on the other for electrodes.

Conditions defined as wet (24 hr. in distilled water at 25° C., tested after removing surface water) and dry (24 hr. in an oven at 100° C. followed by 5 hr. in a desiccator over calcium chloride) were used for power factor. Other tests were made in the "as received" condition without any special preparation.

Results and discussion

The results of this investigation are presented in Table I. Figure 1 graphically illustrates the effect of salt concentration, in all combinations studied, on ignition time. Figure 2 (page 190) indicates trends evidenced by various laminate properties as salt concentration varied for one particular combination (No. 4). The data for all combinations were sufficiently similar and equally erratic to preclude the advisability of preparing additional graphs covering the many other possible correlations between the laminate and the filler properties.

It is recognized that these results are quite variable. In part this is due to the limited number of samples tested. Further, the addition of salts completely altered the behavior of the impregnated fabric, both in the press and drier, from the anticipated results based on experience with normal fabrics. Problems of resin blistering, uneven drying, flaking, excessive or insufficient flow and gas formation were magnified by the presence of salts.

However, these problems were finally held under sufficient control to prepare satisfactory samples for test and the results seemed of sufficient interest to be worthy of calling to the attention of the industry, particularly in light of the dearth of published information in this field.

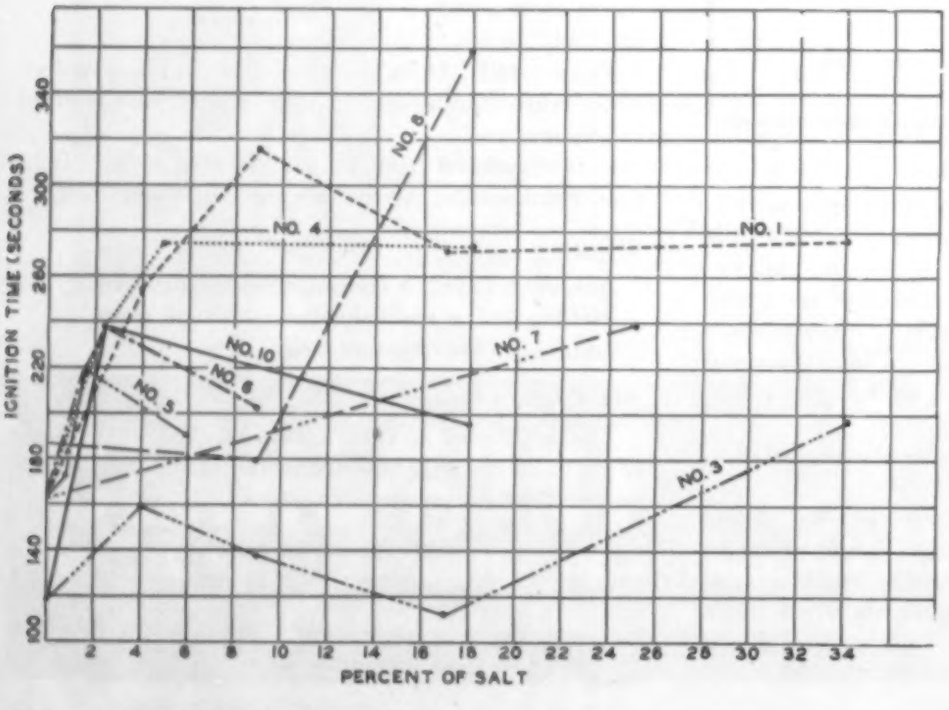
Conclusions

1. With the exception of the samples containing melamine resin, the flame- and glowproof properties of the laminates were definitely improved by the addition of any of the salts studied. In those cases where melamine resin was used, all samples, including the control, were inert to burning.

2. In all cases, the addition of sufficient salt to effect a significant improvement in flame- and glowproofness caused a degradation in mechanical properties.

3. Electrical properties, *tested dry*, were either not affected or were slightly improved by the presence of salts. When *tested wet*, however, the salts effected a marked deterioration in electrical properties.

4. In general, the improvement in flameproofing and the elimination of after-glow are not of sufficient benefit to offset the degradation in mechanical and wet electrical properties. This is especially true for shipboard applications and (*Please turn to page 190*)



1—The influence of salt concentration on ignition time of laminates is illustrated in this graph. The numbers here refer to those given in Table I

Table I.—Effect of Flameproofing Compounds on Properties of Cotton Laminates

Amount of flameproofing salt on sample[a]	Burning			Water absorption (1/8-in. thickness)	Power factor at 1 MC		Dielectric strength (parallel to laminations)	Bonding strength	Tensile strength	Impact strength (edgewise, lengthwise)	Flexural strength
	Ignition time	Burning time	Afterglow		Wet	Dry					
%	sec.	sec.		%			kv.	lb.	p.s.i.	ft.-lb./in.	p.s.i.
No. 1: Fabric base[b]; Bakelite BV1112 resin[c]; Urea and Diammonium Hydrogen Phosphate (2:1 applied in 46% aqueous solution)											
Control	163	303	Yes	1.29	0.120	0.047	48	1843	13,400	2.24	21,100
4	254	272	No	1.19	0.137	0.050	15	1760	13,700	1.70	20,700
9	315	188	No	1.58	0.313	0.042	19	1745	12,500	1.34	18,700
17	270	156	No	1.89	0.294	0.049	12	1233	11,300	0.97	19,100
34	275	77	No	6.72	...	0.026	15	547	9,100	...	...
No. 2: Fabric base; Melmac 402 resin; Urea and Diammonium Hydrogen Phosphate (2:1 applied in 46% aqueous solution)											
Control	600	...	No	2.93	0.102	0.036	10	1202	13,500	2.09	16,200
4	600	...	No	11.53[d]	0.597	0.046	10	927	11,100	2.69	14,900
9	600	...	No	10.83[d]	0.605	0.040	6	683	9,900	2.77	10,400
17	600	...	No	11.87[d]	...	0.041	9	1050	7,200	6.50	9,300
34	600	...	No	16.76[d]	...	0.043	7	595	7,800	2.30	10,900
No. 3: Fabric base; Laminac resin; Urea and Diammonium Hydrogen Phosphate (2:1 applied in 46% aqueous solution)											
Control	117	232	Yes	5.54	0.640	0.049	31	1452	9,200	4.81	9,700
4	159	416	Yes	5.96[d]	...	...	23	1287	7,500	3.74	11,600
9	138	397	Yes	6.59[d]	...	0.044	13	1147	7,500	4.32	10,500
17	112	270	No	8.91[d]	...	0.039	6	740	6,800	3.48	8,500
34	196	117	No	9.87[d]	...	0.036	3	503	7,200	...	8,200
No. 4: Fabric base; Bakelite BV1112 resin; Borax and Boric Acid (7:3 applied in 5% aqueous solution)											
Control	163	303	Yes	1.29	0.120	0.047	48	1843	13,400	2.24	21,100
2.5	238	246	No	1.63[d]	0.141	0.049	39	1762	14,400	1.95	19,300
5	275	246	No	1.91[d]	0.162	0.046	44	1628	13,500	1.75	20,900
18	273	211	No	2.06[d]	0.262	0.043	46	1742	11,500	.89	18,100
No. 5: Fabric base; Bakelite BV1112 resin; Ammonium Dihydrogen Phosphate											
Control	163	303	Yes	1.29	0.120	0.047	48	1843	13,400	2.24	21,100
0.8	174	316	No	1.39[d]	0.102	0.050	39	2002	14,400	1.35	17,600
1.6	219	250	No	1.47[d]	0.165	0.046	17	1737	10,700	1.28	20,000
6.0	190	122	No	1.87[d]	0.235	0.057	12	1532	9,200	0.50	11,400
No. 6: Fabric base; Bakelite BV1112 resin; Borax, Boric Acid and Ammonium Dihydrogen Phosphate (7:3:5 in 10% aqueous solution)											
Control	163	303	Yes	1.29	0.120	0.047	48	1843	13,400	2.24	21,100
1.5	217	300	No	1.52[d]	0.139	0.046	49	1712	11,100	1.42	20,300
2.5	237	201	No	1.98[d]	...	...	28	1407	11,800	1.94	19,100
9.0	203	259	No	2.33[d]	0.228	0.038	48	1403	10,500	0.69	13,900
No. 7: Fabric base; Bakelite BV1112 resin; Zinc Borate											
Control	163	303	Yes	1.29	0.120	0.047	48	1843	13,400	2.24	21,100
25	238	250	No	2.48[d]	0.144	0.038	37	1690	8,050	2.26	18,300
No. 8: Drawn Web base; Bakelite BV1112 resin; Borax and Boric Acid (7:3 applied in 5% aqueous solution)											
Control	187	344	Yes	2.29[d]	0.131	0.042	14	1570	18,300	1.70	28,000
9	180	378	No	2.36[d]	0.122	0.042	8	1630	17,700	1.48	22,700
18	358	191	No	1.62[d]	0.248	0.044	8	1460	13,300	0.74	20,900
No. 9: Drawn Web base; Melmac 402 resin; Borax and Boric Acid (7:3 applied in 5% aqueous solution)											
Control	600	...	No	5.13[d]	0.099	0.036	14	1070	16,600	1.65	27,000
9	600	...	No	5.05[d]	0.510	0.025	23	1010	16,400	1.18	25,700
18	600	...	No	4.13[d]	0.231	0.024	21	1670	15,700	1.00	21,800
No. 10: Fabric base; Laminac resin; Borax and Boric Acid (7:3 applied in 5% aqueous solution)											
Control	117	232	Yes	5.54[d]	0.640	0.049	31	1452	9,200	4.81	9,700
2.5	236	296	Yes	6.17[d]	...	0.043	36	822	7,230	1.99	10,460
18	196	325	Yes	8.04[d]	...	0.043	44	1260	8,280	1.39	12,560

a Percentage of salt based on weight of fabric. *b* Fabric 48 by 44 in. sized, 2.50 yd. per lb. sheeting. *c* Percentage of resin in the laminates varied between 85 and 110 percent based on weight of fabric. *d* Warpage observed.

Mesamoll plasticizers for polyvinyl chloride*†

Mesamoll was mentioned in the Oct. 1945 issue of MODERN PLASTICS on page 152C. In additon to being a good plasticizer for polyvinyl chloride, Mesamoll has the advantage of low cost. A list of raw material cost prices at Dynamit A.G. showed that Mesamoll was the cheapest plasticizer used there and the only one whose cost (RM 1.25s kg.) was below that of polyvinyl chloride (RM 1.30s kg.). Dr. von der Horst's report is of value in indicating directions in which this type of plasticizer may be developed to give some further improved plasticizing properties.

UNDER the influence of short-wave light, the simultaneous action of chlorine and sulfur dioxide on paraffin hydrocarbons gives products claimed to be aliphatic sulfonchlorides because of their hydrolysis to sulfonates as well as other chemical properties. Besides hydrolysis to sulfonates, the reactive group—SO_2Cl—of the sulfonchlorides allows a further series of reactions which have been carried out in the Merseburg ammonia factory; of these, the reaction with phenols will be treated in the present report.

Sulfonic esters are formed in the reaction of the sulfonchlorides with phenols, according to the general formula:

$$\text{Alkyl} \cdot SO_2Cl + HO \cdot \text{Aryl} = HCl + \text{Alkyl} \cdot SO_2 \cdot O \cdot \text{Aryl}$$

On tests by the Colorists' Section at Ludwigshafen these esters have been shown to be excellent plasticizers for polyvinyl chloride.

The starting material for the production of these esters is the mixture of aliphatic hydrocarbons [boiling range 230 to 320° C. (Kogasin II)], produced by the catalytic hydrogenation of carbon monoxide by the Fischer process. To eliminate accompanying substances which inhibit the chlorosulfonation reaction, the Kogasin is purified by catalytic hydrogenation and, after this, gives a mixture of preponderately straight-chained aliphatic hydrocarbons of the average chain-length C_{15}. This is known as Mepasin. The sulfonchloride produced from it has the following formula:

$$C_{15}H_{31}SO_2Cl$$

On the position of the chlorosulfonyl group, so far only this can be said: that the possibility of its entry into the chain is equally great for any of the carbon atoms.

Hydrogen chloride is set free in the esterification with phenols according to the above equation and, in order both to fix this and set the reaction going, one works in an alkaline system. The sulfonchloride may be stirred with sodium phenolate solution or the mixture of phenol and sulfonchloride may be treated with gaseous ammonia. Since this latter method of preparation shows several advantages over that with aqueous phenolate solution, and permits the continuous production of the ester, the esterification by means of ammonia was chiefly used in the laboratory and on the semi-works scale, and was exclusively used in the large-scale manufacture which is now in operation.

It is surprising that the phenyl ester is produced under these conditions, since in earlier experiments with sulfonchlorides of this kind, they reacted easily with ammonia to give sulfonamides. The ammonium chloride formed in this method of production comes down in a solid crystalline form. This process is the subject of patent application O.Z. 11, 302, while the esterification with aqueous phenolates is covered by the applications O.Z. 10, 832 and O.Z. 11, 033.

It should be noted here, that low molecular weight sulfonchlorides can be esterified with phenols in the absence of acid-binding medium; for example, by heating the components in presence of zinc chloride. The following have been obtained in this way:

Phenyl propanesulfonate, b. p. 186° C./20 mm.
Phenyl propanedisulfonate, m. p. 91° C.
Resorcinyl propanedisulfonate, red fluorescent dye similar to Corallin.

Properties of the plasticizer

First known as Mepasinöl Type I, later as Mesamoll, the plasticizer sent to Ludwigshafen for evaluation was a bright yellow oil of medium viscosity which could not be distilled undecomposed, and possessed the property of gelatinizing polyvinyl chloride at increased temperature. By close cooperation with the Colorists' Section, at Ludwigshafen, the properties of this plasticizer were continually improved. This improvement covered the following points.

Color—The first products had a rather dark color—200 to 300 on the I. G. scale. Since they were not distillable, it was necessary in the preparation of the starting materials, as well as in the esterification itself, to guard against overheating and the presence of iron,

* The Office of Technical Services, Department of Commerce, hopes that the dissemination of these reports will be of direct benefit to American science and industry. The Office does not undertake to edit the reports, nor does it accept the responsibility for the information or opinions contained in them. Interested parties should realize that some products and processes described may also be the subject of United States patents or of patents granted by friendly foreign governments. Accordingly, it is recommended that the usual patent study be made before pursuing practical applications.

† Report by Dr. von der Horst, Research Laboratory, Merseburg ammonia factory, I. G. Farbenindustrie; translation prepared by J. W. C. Crawford, British Ministry of Supply. This is PB 28554.

both agents for deepening the color. By extensive use of polyvinyl chloride for cladding of the chlorosulfonation vessel and piping, and of V2A stainless steel for the esterification vessel and blowing tower, as well as by cautious heating during expulsion of the volatile constituents, the color of the product prepared on the semi-works scale fell to 20–30 units.

Smell—Initially, objection was made to the plasticizer often having a smell of phenol, which arose from traces of the phenol mixture not removed when the volatiles were blown out. Plasticizers of satisfactory odor were supplied as a result of intensification of the blowing by use of a vacuum stripping column with superheated steam in countercurrent.

The pH—In the esterification with ammonia there occurs, besides the formation of phenyl sulfonic ester, production to a small extent of sulfonimide by reaction of the sulfonchloride with ammonia. This is hydrolyzed in the treatment with steam in the blowing tower to free sulfonic acid and thus caused an acid reaction in the early samples of plasticizer. After Troisdorf had made us aware of the permissible limits of pH for plasticizers, we were able to establish the desired pH by addition of small amounts of soda during the blowing.

Water resistance—The water resistance of the products in 60:40 polyvinyl chloride films was at first unsatisfactory and reached the order of 20 percent water absorption after 11 days at 20° C. This effect could be due to two causes:

1. In neutralizing the acid reaction by means of soda, some sodium sulfonate was naturally produced; this is known to be hygroscopic and would favor the entry of water into the film. When we changed over to low-volatile organic amines or hydroxyamines for the neutralization, the water absorption fell to 8 percent. About 0.2 percent of the amines was necessary. The amines dissolve to a clear solution in the ester so that, in contrast to the neutralization by soda, final filtration is unnecessary. Since, however, it is impossible to obtain the necessary amounts of triethanolamine, current production is being neutralized with soda. For peace-time conditions it is intended to go over to the organic bases.

2. The plasticizer undergoes a further improvement in water resistance by reducing the extent of chlorosulfonation of the Mepasin so as to avoid to a large extent the formation of disulfonchlorides, which favor water absorption by accumulation of hydrophilic groups in the molecule.

Cold resistance—The cold resistance of the films, at first +5 to −5° C., was also improved by using as esterification component a sulfonchloride which contained relatively little disulfonchlorides. As a result, the cold resistance fell to from −10 to −15° C.

Viscosity—While the viscosity of the plasticizer is without importance for the production of films and flexible tubes, it plays a considerable part in the preparation and application of polyvinyl chloride pastes. The lower the viscosity of the plasticizer—and therefore of the paste made with it—the easier the de-aeration of the latter and the freeing of the object cast from it from bubbles. Moreover, it can be coated more uniformly on jute (for coated sacking) or cast in molds. In this respect we could also produce an improvement by using in the esterification a less highly sulfonchlorinated Mepasin—10.5 percent hydrolyzable chlorine, instead of the earlier 12.5 percent—and thus reducing the disulfonic ester content of the Mesamoll. By this change the viscosity fell from the earlier 70 to 90° E. to the present 30 to 35° E. at 20° C.

Effect of various components

It may be remarked here that, in general, variation of the sulfonchloride component exerts a greater influence on the plasticizing properties of the ester than variation of the phenolic component. On the one hand, the gelatinizing power rises with falling chain length of the sulfonchloride component in such a way that, for example, it is no longer possible to prepare a stable polyvinyl chloride paste with phenyl propanesulfonate while, on the other hand, defective cold resistance appears on packing chlorine or sulfonic esters into the paraffin chain. Deterioration of the gelatinizing power of such esters takes place if, instead of phenol-cresol mixtures such as are present in the SR II oil used up till now, one uses chlorophenols or higher alkylated phenols—i-octyl phenol. The same occurs if one passes from the Mepasin to petroleum raw material.

There are still various possibilities of varying the ester, which lead to plasticizers with special properties, so that work in this field continues at Leuna. Since the phenolic component, apart from the above, is without influence on the plasticizing properties of the ester, one is in the position to take advantage of the present favorable situation on the phenol market and especially to make use of the normally little-used xylenols.

Evaluation

The first evaluation of the products took place at Ludwigshafen, as has already been mentioned. Later, larger samples were supplied to Bitterfeld as plasticizers for polyvinyl chloride for flexible tubing, gasket material and especially for coating of jute. In using pastes for jute coating, the disadvantage originally appeared to be that at a temperature of 140° C. (then the highest used) Mesamoll had too slow a gelatinizing speed in comparison with tricresyl phosphate and Palatinol. It was therefore necessary for us to develop a special type for this purpose. However, after it had been recognized that damage to the fiber did not occur at 160° C., the objection on the grounds of speed of gelatinization was dropped, especially after Ludwigshafen had shown that the speed of gelatinization at 160° C. was the same as that of tricresyl phosphate.

Physiological test of the ester by the I. G. Industrial Hygiene Laboratory at Elberfeld, has proved the harmlessness of the products in contact with the skin, which is important for their use for packing foodstuffs.

The substance was announced in March 1939 by the Kuteko, at that time under the name Mepasinöl Type

I. Thereafter a further testing was undertaken by Troisdorf, Eilenburg, Ludwigshafen and Bitterfeld. On the grounds of the favorable results obtained from this, we started up in the summer of 1940 an experimental plant to produce 30 tons per month of plasticizer. The experience obtained in this plant served as a basis for the construction of a larger plant with a production of about 150 tons per month, whose capacity has been increased this year (1941) to 300 tons and should be raised in 1942 to 450.

In comparing Mesamoll with tricresyl phosphate on a raw material basis, it is important to note that the phenol component in Mesamoll amounts to 28 percent as against 87 percent in tricresyl phosphate and that the difficult-to-obtain phosphoric acid is not needed in Mesamoll.

Patent position

The first stage of the process leading to the ester—the chlorosulfonation—has already been described in an American patent and is, of course, free in Germany. On the other hand, the special methods which are the only way high quality sulfonchlorides, suitable for working up into esters, can be prepared economically are widely covered by I. G. in a series of patent applications. We are completely protected at the second stage of the process—the treatment of the sulfonchlorides with alcohols or phenols—for both our operating methods, that is, the aqueous alkaline esterification and the esterification with gaseous ammonia.

Improvement of Mesamoll I

The Mersol D previously employed for esterification was obtained by chlorosulfonation to a content of hydrolyzable chloride of 10 to 11 percent. As we now know through improved methods of analysis, it contained about 35 percent of disulfonchloride. Mesamoll prepared from this contained an equivalent amount of disulfonic acid phenyl esters, which we knew from earlier experiments had poor properties and were particularly harmful to the cold resistance. Thus, the quality of the Mesamoll made from Mersol D suffered from the disadvantageous properties of the diester.

Our work was, therefore, directed to depressing the diester content of the Mesamoll; and this was effected by a lower (halved) degree of chlorosulfonation. The method, it is true, left a larger portion of the initial Mepasin as so-called neutral oil, but the removal of this by vacuum steam distillation created no difficulties, as in any case such treatment was normally given. In contrast to the first-described Mersol D, in which chlorosulfonation had been carried through for introduction of one chlorosulfonyl radical, the half-chlorosulfonated Mersol H contained only about 6 percent hydrolyzable chlorine. Such Mersol still contains 15 percent of disulfonchloride, but this is considerably less than in the earlier Mersol D. The ester prepared from it—Mesamoll H—was, therefore, considerably better than the original Mesamoll I, since it contained less disulfonic ester.

Property	*Mesamoll I*	*Mesamoll H*
Specific gravity	1.06 to 1.08	1.03 to 1.04
Viscosity at 20° C., ° E.	30 to 38	14 to 16
Cold resistance, ° C.[a]	−4 to −10	−16 to −24

[a] For film made from PVC 60 percent, Mesamoll 40 percent.

Apart from the important improvement in the cold resistance, the lower viscosity of Mesamoll H makes paste manufacture at Bitterfeld easier.

Mesamoll HB

Another variety of Mesamoll is Mesamoll HB. This is a mixture of two parts of Mesamoll H and one part of a special brown coal hydrogenation product. It comes primarily into consideration for introduction into the P-Sohle (shoe sole) field as plasticizer.

The Ludwigshafen shoe sole recipe served as starting-point for our investigations:

50 parts polyvinyl chloride (Igelit PCU).
15 parts filler.
35 parts plasticizer mixture.

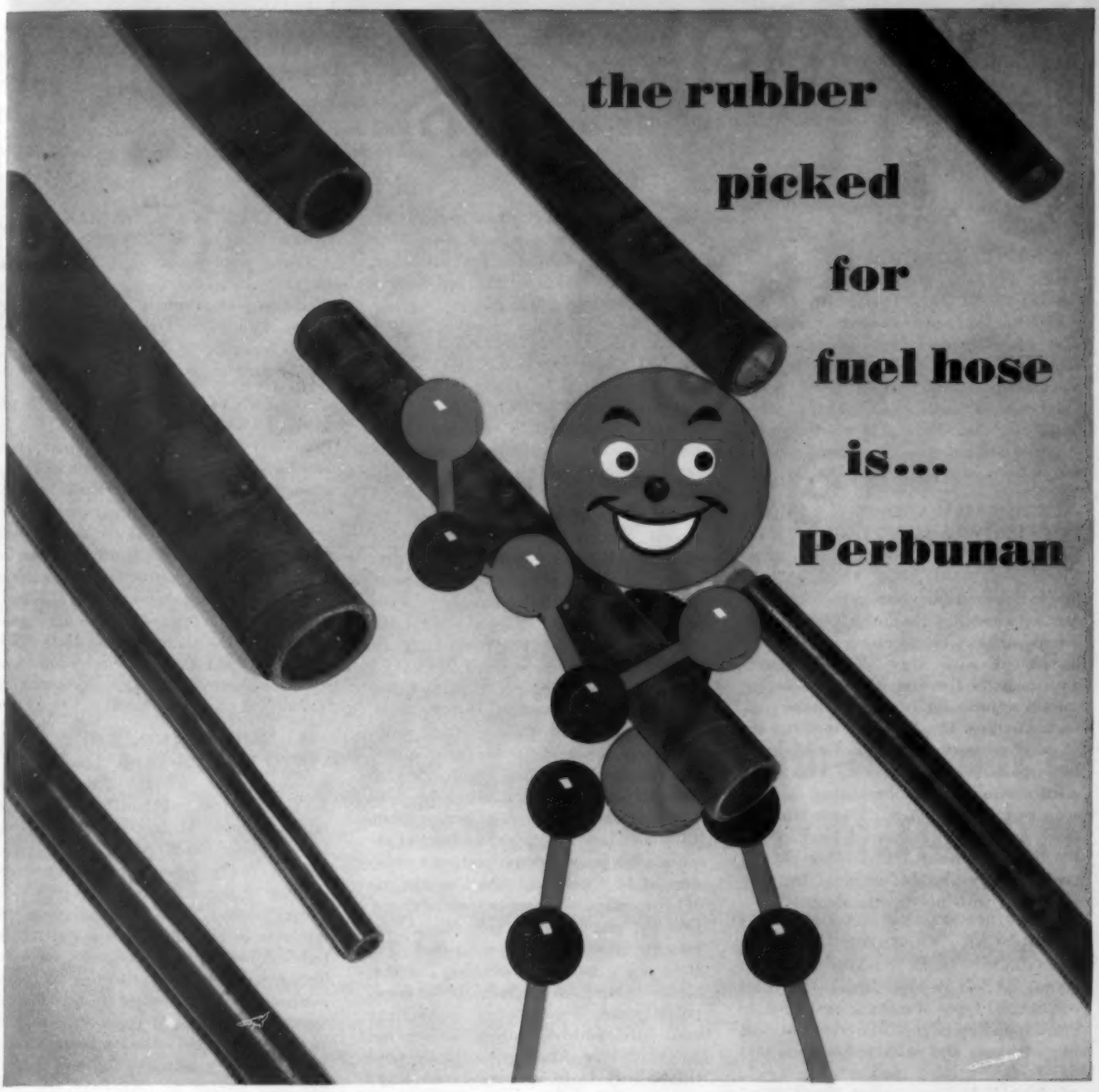
The plasticizer consisted of equal parts of Mesamoll, Palatinol HS[1] and Palatinol F.[2] We first sought to replace a part of the very scarce Palatinol F by Mesamoll HB. As long as silica powder was used as filler, the cold resistance decreased to (*Please turn to page 192*)

[1] Diphthalate ester prepared with Leuna alcohol 145 to 162° C. (60 percent 2-methylhexanol-1, 40 percent 2-methylpentanol-1 and small amounts of secondary alcohols).
[2] Diphthalate ester prepared with C_7-C_9 Fischer-Tropsch alcohols.

Table I.—Properties of Polyvinyl Chloride Shoe Soles Plasticized with Mesamolls

No.	*Type*	*PVC*	*Filler*		*Plasticizer*				*Cold resistance*	*Shore hardness*	*Abrasion No.*[a]
			SiO_2	*Kaolin*	*Mesamoll I*	*Palatinol HS*	*Palatinol F*	*Mesamoll HB*			
									° C.		
...	Ludwigshafen recipe	50	15	...	11	12	12	...	−30 to −35	75	...
202	Part replacement of Palatinol F	50	15	...	11	12	9	3	−25	77	40
185	Kaolin instead of silica	50	...	15	11	12	9	3	−32	76	46
194	Saving of PVC	38	20	...	12	...	...	30	−28	70	36
174	Kaolin instead of silica	38	...	20	12	...	...	30	−31	69	72
184	Absence of Mesamoll HB	38	...	20	42	...	...	...	−33	63	32

[a] Definition of the abrasion number: 15 mm. wide strips of sole material are bent into loops and the bowed parts rubbed on No. 100/1 emery paper along a 20 mm. path, with uniform pressure and velocity. Number of back and forward strokes until the sole is first visibly worn through is the abrasion number.



The Metal Hose & Tubing Company of Dover, N. J., picks Perbunan for the rubber backbone of its extensive line of National Synthetic Hose, the "hose for all petroleum products."

Delivering fuel oil and diesel oil...dispensing gasoline from truck and tank...meeting hose specifications of many Army and Navy needs—are but a few instances where Perbunan plays an important helping role in the high performance demanded of National Synthetic Hose.

Our rubber engineers are ready to cooperate on any compounding problems. Write for further information.

For Improved Rubber Parts . . . Compound With PERBUNAN! Resists damage from water, oil, excessive heat, abrasions and petroleum hydrocarbons . . . retains flexibility at sub-zero temperatures!

PERBUNAN
REG. U. S. PAT. OFF.

THE SYNTHETIC RUBBER THAT RESISTS OIL, COLD, HEAT AND TIME

Copyright 1947, Enjay Company, Inc.

ENJAY COMPANY, INC. (Formerly Chemical Products Department, Stanco Distributors, Inc.), 26 Broadway, New York 4, N. Y.

Plastics Digest

This digest includes each month the more important articles of interest to those who make or use plastics. Mail request for periodicals directly to publishers.

General

RECENT ADVANCES IN PLASTICS. N. J. L. Megson. British Plastics *18*, 476–83 (Nov. 1946). Recent developments in plastics are reviewed. The more fundamental advances are considered. The main topics include phenolic resins, vulcanizing agents, polyvinyl plastics, acetylene chemistry, polyurethanes, the silicones, polytetrafluoroethylene and ion exchange resins. Seventeen references.

FIBRIN FILM AND OTHER PRODUCTS FROM HUMAN PLASMA. J. D. Ferry and P. R. Morrison. Ind. Eng. Chem. *38*, 1217–21 (Dec. 1946). Fibrin film is prepared from human fibrinogen by clotting with thrombin under specified conditions so that the resulting clot can be compacted with very slight pressure. Treatment of the film with steam, after careful adjustment of the moisture content, sterilizes the film and modifies its physical properties as well as its susceptibility to enzymatic digestion. This treatment is also used to form shaped objects, such as tubes and cups. Fibrin film has been extensively employed in surgery. Plastics of fibrinogen and other plasma proteins may also be prepared by heat treatment with polyhydric alcohols.

FOR CAR WINDOWS—PLASTIC OR GLASS? G. B. Watkins and J. D. Ryan. SAE J. *54*, 54–5 (Dec. 1946). Two commercial types of methyl methacrylate plastics and an allyl plastic were installed in motor cars and subjected to a normal day-to-day driving test. The acrylic windshields had an average life of 30–45 days and the allyl windshield of 60–180 days. Glass windshields are in better condition after 3 to 4 years than the plastics are after a few weeks of service. Side windows of plastics, although scratched, were still serviceable after one year. The low thermal conductivity of plastics retards the melting of ice and snow on the outside. Plastics are more prone to rattle than glass and are more difficult to clean. Since they are not wetted by water as readily as glass they hamper vision more in the rain.

MANUFACTURE OF FILM . . . AN OUTLINE OF METHODS. W. H. Aiken. Modern Packaging *20*, 147–52 (Dec. 1946). The methods used in the manufacture of plastic and cellulose films are described. These include drum solution casting, belt solution casting, extrusion of a solution into a non-solvent liquid, extrusion into an acid coagulating bath, dipping, calendering, heat extrusion, wet extrusion, block skiving, roll skiving and cast polymerization.

PLASTIC COMPOSITIONS FOR DIELECTRIC APPLICATIONS. W. C. Goggin and R. F. Boyer. Ind. Eng. Chem. *38*, 1090–6 (Nov. 1946). The widespread application of electronic equipment in the recent war effort required the development of a number of new types of plastic materials, as well as of numerous modifications of the existing types. In general, these materials had to possess very carefully specified dielectric properties over a wide range of frequency, temperature and relative humidity. Low power factor, low dielectric constant, and high volume and surface resistivity were a typical combination of desired properties. High dielectric constant and low power factor were occasionally specified. Coupled with these electrical properties was the need for rigid mechanical performance, including high impact strength and excellent dimensional stability over extreme ranges of temperature. These combined electrical-mechanical requirements posed difficult problems which were at least partially solved by the use of hydrocarbon polymers or their mixtures. Detailed properties of these plastics are presented, along with a discussion of their origin and applications. The materials considered include polystyrene, polyethylene, mixtures of polystyrene and polyisobutene, polydichlorostyrene, polyvinylidene chloride, polystyrene plasticized with hydrocarbons, styrene-alkyd resins, ethyl cellulose and polystyrene cross-linked with ethylvinylbenzene and divinylbenzene. The applications considered include potting compounds, radomes, sandwich fillers, proximity fuse housings and coaxial cables.

Materials

POLYMERIZATION OF *d-s*-BUTYL *p*-VINYLBENZOATE. C. S. Marvel and C. G. Overberger. J. Am. Chem. Soc. *68*, 2106–7 (Oct. 1946). *d-s*-Butyl *p*-vinylbenzoate was prepared and polymerized in bulk. The change in rotation as the monomer is polymerized is too small to make this monomer of use in kinetic studies of polymerization. The saponification of the optically active polyester gives an inactive polyacid, hence no asymmetric synthesis occurred during polymerization.

TERYLENE—A NEW MATERIAL. British Plastics *18*, 505 (Nov. 1946). Terylene, a polyester resin derived from terephthalic acid and ethylene glycol, is described. It is made in the form of fibers. It has a high modulus of elasticity and is outstanding in resistance to heat, light and water.

ALTERNATIVE PHENOLS FOR MOLDING POWDERS. H. R. Fleck. Plastics (London) *10*, 569–74 (Nov. 1946). Beechwood creosote as a source of other phenols for phenol itself in the manufacture of molding powders is discussed. Sixty-five percent of the creosote should react with formaldehyde to give resins; the ratio of thermosetting to thermoplastic material would be approximately 1:2.57. Since a common type of cresylic acid gives material with a thermosetting to thermoplastic ratio of 1:1.28, the beachwood creosote should prove valuable as a diluent for *m*-cresol or phenol.

POLYMERIZATION OF ARYL VINYL ETHERS. I. P. Losev, O. Y. Fedotova and E. B. Trostyanskaya. J. Gen. Chem. (U.S.S.R.) *15*, 353–7 (1945); Chem. Abstracts *40*, 3737 (July 10, 1946). Phenyl vinyl ether polymerizes in the presence of aluminum chloride or boron trifluoride to give hard glassy solids. These hard polymers are insoluble in alcohols, ketones and alkalis but soluble in other organic solvents. Tacky polymers are produced by polymerization with other catalysts. Phenyl vinyl ether does not copolymerize with vinyl acetate and styrene, respectively. Hard polymers with film-forming properties were formed by copolymerizing with maleic anhydride and trivinyl glyceride, respectively.

MICROCRYSTALLINE WAXES—THEIR MANUFACTURE, PROPERTIES AND USES IN THE PAPER INDUSTRY. B. H. Clary. Paper Ind. Paper World *27*, 1679–82 (1946). The manufacture, properties and applications of microcrystalline waxes are reviewed.

PLASTIC PROPERTIES OF THE HIGHER FATTY ACID DERIVATIVES OF PROTEINS. W. G. Gordon, A. E. Brown, C. M. McGrory and E. C. Gall. Ind. Eng. Chem. *38*, 1243–5 (Dec. 1946). The modification of casein by higher fatty acid residues yields materials which in certain respects are superior to the unmodified protein as plastic molding powders. Progressively higher acylation affects the plastic properties of casein as

"PACKAGE" your product to *Sell*



with one coat of M&W's gleaming METALUSTRE

Slip your product into a shimmering coat of Metalustre and put yourself a step ahead of the field in getting people to take what you make. Available in practically every color, as either a lacquer or synthetic finish to meet individual production requirements, Metalustre contains metallic powder . . . air-dries quickly or bakes to a lustrous metallic finish that really gleams and "sells" . . . and with just a one-coat application.

What's more, Metalustre is a durable, tough finish that resists perspiration, outdoor elements. Its combination of good adhesion plus flexibility prevents chipping or peeling when objects finished with Metalustre are dented or bent. Metalustre may be used on most metals, wood or plastic with either the spray or dip method. Write today for Technical Data Bulletin 102 and the Metalustre color card.

PIONEERS IN PROTECTION

M.&W.Co. 1876

. . . where industry goes with finishing problems

MAAS & WALDSTEIN COMPANY NEWARK 4, NEW JERSEY

1658 Carroll Avenue, Chicago 12 • 6 Jersey Street, Boston 15 • 10751 Venice Boulevard, Los Angeles 34

PRODUCERS OF LACQUERS, ENAMELS, SYNTHETICS AND SPECIALIZED PRODUCTION FINISHES

follows: Water absorption is reduced, plastic flow in the presence of 6 to 12 percent water as plasticizer is improved and tensile and flexural strengths are decreased. A moderate degree of acylation followed by a short treatment with formaldehyde results in the best over-all combination of properties. In the case of palmitoyl, zein hardening with formaldehyde is unnecessary and the product has an unusually low water absorption. Test pieces molded from moderately acylated casein are relatively stable in dimensions, have A.S.T.M. water absorptions of 5 to 6 percent in 24 hours, tensile strengths of 5000–6000 p.s.i. and flexural strengths of the same order of magnitude.

PREPARATION OF 2-THIENYL-METHYLCARBINOL AND α-VINYL-THIOPHENE. R. T. Nazzaro and J. L. Bullock. J. Am. Chem. Soc. *68*, 2121–2 (Oct.1946). The preparation of 2-thienyl-methylcarbinol and α-vinylthiophene is described. α-Vinylthiophene polymerizes at room temperature to a yellow transparent resin characterized by flexibility despite apparent hardness.

Applications

RESINS FOR PRINTING INKS. H. A. Idle. J. Oil & Colour Chem. Assoc. *29*, 253–8 (Oct. 1946). The evaluation of resins for use in printing inks is described.

SHRINK SEALS OF TOUGH VINYL PLASTICS. Modern Packaging *20*, 138–9 (Nov. 1946). Shrink-seals for bottle caps are made of a vinyl plastic. This material is tough and durable. The water-vapor permeability is much less than that of similar seals made of cellulose. The dilator solution is non-aqueous. The seals are unaffected by boiling water, sterilizing techniques, acids and alkalis.

MOLDED AND MACHINED NYLON. L. L. Stott. Product Eng. *17*, 103–7 (Dec. 1946). The properties, molding, machining and applications of two types of molded nylon are described. The applications are classified as valve seats and seals, electrical insulating parts, and gears and bearings.

LOW-DENSITY ROTOR BLADES. G. P. Martin. Aero Digest *53*, 91, 121 (Nov. 1946). A low-density rotor blade made of stainless steel, wood, plastic and resinous adhesives is described. The materials used in making the hollow blade consist of mahogany veneers, spruce plywood and resin impregnated paper. The leading edge is covered with stainless steel. Resinous adhesives are used throughout.

PROTEIN ADHESIVES. A. Frieden. Chem. Ind. *59*, 835–7 (Nov. 1946). The preparation, properties and applications of adhesives based on proteins such as animal gelatin, casein soya protein and albumens are described.

PHYSICAL CHARACTERISTICS AND REQUIREMENTS FOR FILMS FOR PRODUCE. H. Platenius. Modern Packaging *38*, 139–43, 170 (Oct. 1946). The properties of plastic films are considered in relation to the requirements for packaging fresh fruits and vegetables. For this purpose they must be permeable to oxygen and to carbon dioxide. The oxygen requirements of various fruits and vegetables and the permeability of various transparent plastic films to oxygen and carbon dioxide were measured.

RUBBER BONDING AND THE PLASTICS INDUSTRY. T. W. Malden. Plastics (London) *10*, 625–7 (Dec. 1946). Techniques for bonding natural and synthetic rubbers to metals are reviewed. These include special metal interlayers, polyisocyanate adhesives, ebonite process, chlorinated rubber adhesives, cyclized rubber, rubber hydrochloride adhesives and phenolic adhesives. Applications are also considered. Seven references.

USE OF UNSATURATED POLYESTER RESINS FOR EMBEDDING BIOLOGICAL MATERIAL. T. H. Romaniak. Science *104*, 601–2 (Dec. 20, 1946). Biological specimens are imbedded in a transparent colorless unsaturated polyester resin for preservation. The plastic clears the specimens making them transparent and the internal structure visible. The plastic is thermosetting. Chick embryos, pig embryos, jellyfish, flukes and similar forms have been embedded successfully in this resin. Detailed directions for preparing specimens and casting resin around them are given.

Coatings

DEVELOPMENTS IN SOLVENT AND PLASTICIZER TECHNOLOGY. W. A. Woodcock. Paint Ind. Mag. *61*, 124–6, 128–30 (1946). The effects of plasticizers on the efficiency, flexibility, temperature resistivity and stress-strain relationship are discussed.

RESINS FOR PAINTS AND VARNISHES. H. G. Rains. J. Oil & Colour Chem. Assoc. *29*, 239–47 (Oct. 1946). Methods of evaluating resins for use in paint and varnish formulation are given.

IMIDE - MODIFIED ALKYD RESINS. H. J. Wright and R. N. DuPuis. Ind. Eng. Chem. *38*, 1303–8 (Dec. 1946). Replacement of part of the ester linkages in an alkyd resin with amidic linkages was attempted by introducing part or all of the fatty acid radical as an amide of glyceryl monoamine. The amide appeared to undergo a rearrangement resulting in the formation of an N-substituted imide of the dibasic acid used. These imide-modified alkyds, which can be prepared through substitution of a glyceryl-amine for part of the glycerol, can be made with very low fatty acid content and low acid numbers, and give hard, fast-drying films. Properties of representative imide-modified alkyds are described and a possible mechanism involved in their preparation is given. Evidence is presented which indicates that a rearrangement takes place when fatty amides are heated with phthalic anhydride in the presence of hydroxyl groups. A method of calculation was devised for the prediction of the acid number of an alkyd resin from its formula and for reducing the acid number of an alkyd to any desired value by replacing part of the dibasic acid with an N-hydroxyalkyl imide.

RESINS FOR NITROCELLULOSE. B. G. Lewin. J. Oil & Colour Chem. Assoc. *29*, 247–53 (Oct. 1946). The effects of adding resins on the properties of cellulose nitrate coatings are described.

NEW CHEMICAL COATING TO PROTECT METALS. Chemical Industries *59*, 1001 (Dec. 1946). A new metal primer with outstanding adhesion to metal is described. The primer consists of a polyvinyl butyral resin mixed with 30 to 50 percent by weight of phosphoric acid. The coating is easy to apply, is relatively inexpensive, and virtually eliminates corrosion creep. Films of less than 0.0005 in. thickness are effective. The usual types of coatings work very well over this primer.

STYRENE COPOLYMERS IN SURFACE COATINGS. D. H. Hewitt. J. Oil & Colour Chem. Assoc. *29*, 109–28 (June 1946). Styrene copolymerized with fatty acids and oils produce coating resins with the following properties: 1) air drys rapidly to touch by solvent release; 2) after-harden by oxidation in the presence of driers to films having a variety of properties; 3) low acid value and good stability towards all pigments; 4) moderate wetting properties but excellent suspension for pigments; 5) pale color, good color retention and lack of dirt retention; 6) good water resistance; and 7) good electrical properties, particularly with regard to anti-tracking. Styrene polymerization with non-conjugated unsaturated fatty acid radicals is a chain transfer process which proceeds more readily than the corresponding chain transfer with a relatively inert solvent such as xylol. A range of chain lengths is produced. Styrene copolymerization with conjugated fatty acid radicals involves propagation of the styrene chain across the conjugated system as in the styrene-butadiene reaction. In poly-reactive systems, chains are short and the products homogeneous. Where both types of radical are present in a molecule, the degree of conjugation in conjunction with the complexity (viscosity) will determine which process predominates and hence the compatibility of the species produced. Twenty-four references.

HOW INTERLAKE *Resineering* serves resin users

Interlake *Resineering*—the functional engineering of a resin for the specific requirements of each job—consists of four steps:

1 Thorough analysis of your resin problem followed by our recommendation.



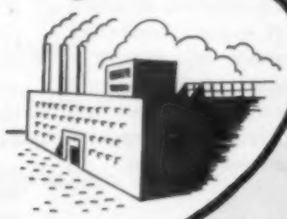
2 Development of a resin for your particular application.



3 Testing this resin on the job, in *your* plant, working with *your* operating men.



4 Stabilizing its production for continuous uniformity in performance.



Interlake service features analytic test reports with each delivery, and general consultation at any time on your use of resins. If you use resins investigate Interlake *Resineering*. Write Interlake Chemical Corporation, Union Commerce Bldg., Cleveland 14, Ohio.

INTERLAKE CHEMICAL Corporation

• PRODUCTS FROM COAL •

Technical Briefs

Abstracts of articles on plastics in the world's scientific and engineering literature relating to properties and testing methods, or indicating significant trends and developments.

Engineering

EXTENDING PHENOLIC RESIN PLYWOOD GLUES WITH PROTEINACEOUS MATERIALS. G. E. Babcock and A. K. Smith. Ind. Eng. Chem. *39*, 85–8 (Jan. 1947). Vegetable proteinaceous materials such as corn gluten and soybean meal can be used in substantial amounts as extenders for phenolic resin plywood glues. To attain the best results in this combination, it is necessary to use a resin of low molecular weight and proteinaceous materials low in water-soluble constituents. Formulae containing resin and protein materials in the ratio of 6:4 give rapid curing glue lines which meet the established standards for exterior grade plywood with a considerable saving in glue cost.

STATISTICAL QUALITY CONTROL. C. Wainwright. British Plastics *18*, 524–30 (Dec. 1946). The application of statistical quality control principles in the preparation of specifications for plastics is discussed.

Chemistry

FREE RADICAL POLYMERIZATION OF THE VAPORS OF CERTAIN VINYL DERIVATIVES. T. T. Jones and H. W. Melville. Proc. Roy. Soc. *187*, 37–53 (Oct. 8, 1946). The free radical polymerization of the vapors of vinyl chloride, acrylic nitrile, styrene, butadiene and methyl isopropenyl ketone was investigated using methyl radicals from photodecomposing acetone. Although all the reactions do not exhibit ideal behavior, it is possible by the application of kinetic methods to measure the ratio of the propagation to the termination coefficients for these polymerization reactions. In this way relative values of the quantitative tendency for a molecule to polymerize by a free radical mechanism can be computed accurately.

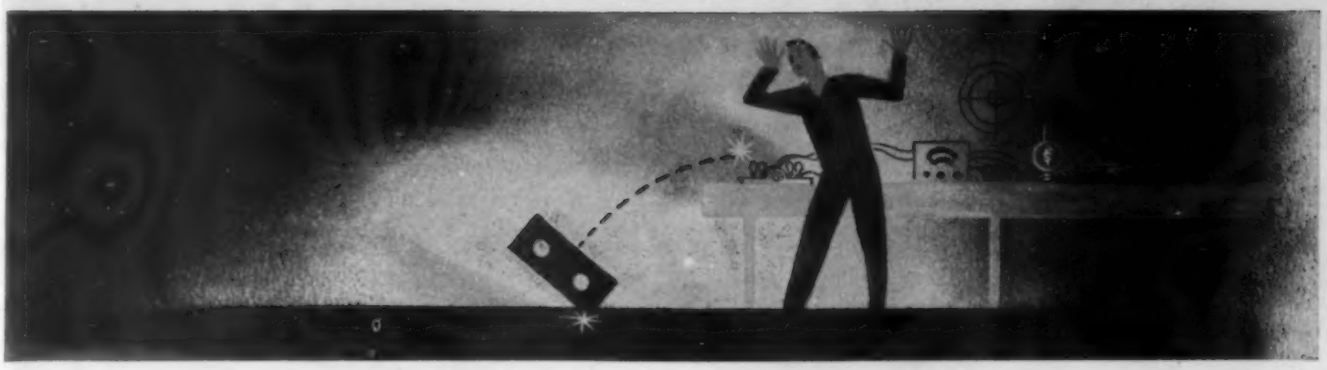
RATE CONSTANTS OF STEPS IN ADDITION POLYMERIZATION. C. G. Swain and P. D. Bartlett. J. Am. Chem. Soc. *68*, 2381–6 (Nov. 1946). The average lifetime of the growing chains in the photopolymerization of liquid vinyl acetate was determined, using the rotating sector method of Melville and light of wave length greater than 2998 A. On the assumption that the chain propagating and chain terminating steps are identical for photochemical and peroxide-induced polymerization of liquid vinyl acetate, the rate of photochemical initiation of chains was determined by appropriate combination of measurements upon these two types of polymerization. This makes possible the determination of the absolute rate constants for chain propagation and chain termination, and also the evaluation of such quantities as the concentration of free radicals at the steady state under any given conditions, the kinetic chain length, and the time required for establishment of the steady state. A comparison is made with the recent results announced by other investigators whose value of the chain termination constant does not agree with the one reported here.

PHOTOCHEMICAL POLYMERIZATION OF METHYL VINYL KETONE VAPOR. T. T. Jones and H. W. Melville. Proc. Roy. Soc. *187*, 19–36 (Oct. 8, 1946). The photo-polymerization of methyl vinyl ketone vapor at pressures up to 60 mm. and temperatures between 0 and 60° C. was investigated with the following results. The kinetic order of the reaction increases with pressure and decreases with increasing temperature. The highest order recorded is 7.4. The temperature coefficient of the reaction is negative, but the rate does not obey the usual exponential relationship. The polymer produced is insoluble. These observations all point to the intervention of a branched chain mechanism and on this basis the abnormal kinetics may be quantitatively explained. The polymerization occurs by the splitting of the methyl vinyl ketone molecule into free radicals, probably methyl and acrylyl. The methyl radical initiates a free radical polymerization which is terminated by a mutual interaction of two radicals in the vapor phase. The acrylyl radical appears to break up with the production of carbon monoxide, the vinyl radicals combining to yield butadiene which plays no further part in the reaction. A micro-vapor pressure analyzer is described which will deal with a few cubic mm. of vapor at standard temperature and pressure.

Properties

FABRIC BASE PLASTICS. K. W. Pepper, F. T. Barwell and D. K. Hale. J. Soc. Chem. Ind. *65*, 153–64 (June 1946). The applicability of the "voids theory" to laminates made from a phenolic resin and a loomstate cotton cambric was studied. The effect of systematic variations in the bonding pressure and in the resin content on the density, tensile strength, on the Young's modulus, shear strength, compressive strength and water absorption of the products was determined. While, in general, the results conform to the "voids theory," two important anomalies were revealed: a) the tensile strength of apparently fully bonded boards of 20 percent resin content was considerably lower than was to be expected from values obtained at higher resin contents; b) the interlaminar shear strength was low and dependent on resin content. The effect of the amount of volatile matter in the impregnated fabric was entirely consistent with previous experience. Examination of desized and scoured cambric indicated that the presence of wax or other contaminant on the surface of the cotton fibers has a marked deleterious effect on impregnation and on the adhesion between resin and fibers. This conclusion was confirmed by tests on specially "detwisted" fabric. It is suggested that the effective strength of cotton fibers in well-bonded laminates may exceed the value obtained from tests on the fibers themselves.

ISOSTATIC METHOD FOR DETERMINING THE GAS PERMEABILITY OF SHEET MATERIALS. D. W. Davis. Paper Trade J. *123*, 97–104 (Aug. 29, 1946). Apparatus and a method for determining the gas permeability of sheet materials under isostatic conditions are described. The gas to be tested is passed over one side of the test sheets, which are held, free of any face support, in a diffusion cell and a different "sweep" gas is passed over the other side. Both gases are at approximately atmospheric pressure. The sweep gas entrains any test gas which permeates the test sheets and the permeated test gas is determined by chemical methods. For carbon dioxide permeability, the oxygen, used as the sweep gas, is passed through Ascarite where the permeated carbon dioxide is absorbed and determined gravimetrically. For other test gases, such as oxygen or nitrogen, the carbon dioxide used as the sweep gas is absorbed in potassium hydroxide solution and the permeated test gas is determined volumetrically. Several advantages are claimed for this method. Carbon dioxide and oxygen permeability values are given for a wide variety of sheet materials at various temperatures and relative humidities. Water vapor permeabilities also can be determined by this method. Results show that varying the relative humidity between 0 and 75 percent has little or no effect on the gas permeability of such nonmoisture sensi-



for low cost, dielectric laminates of high mechanical strength rely on

NO. 5012 PLYOPHEN

No. 5012 Plyophen is winning wide fame as a "practical" laminating varnish for general purpose applications. Used with either paper or canvas, it produces sound laminates with mechanical and electrical properties well above average. Used in place of cresol type materials, it will be found satisfactory in every way. Write for suggested applications of this widely useful member of the versatile Plyophen family.

REICHHOLD CHEMICALS, INC.

General Offices and Main Plant, Detroit 20, Michigan

Other Plants: Brooklyn, New York • Elizabeth, New Jersey • South San Francisco, California • Seattle, Washington • Tuscaloosa, Alabama
Liverpool, England • Paris, France • Sydney, Australia • Zurich, Switzerland • Milan, Italy • Rio de Janeiro, Brazil

SYNTHETIC RESINS • CHEMICAL COLORS • PHENOLIC PLASTICS • INDUSTRIAL CHEMICALS

tive sheets as polyvinylidene chloride, polystyrene and polyvinyl butyral. With other materials which are also relatively nonmoisture sensitive, such as cellulose acetate, polyvinyl chloride, nylon and rubber hydrochloride, the gas permeability tends to decrease as the relative humidity is increased. Extremely moisture-sensitive sheets such as PT cellophane and polyvinyl alcohol show tremendous increases in the permeability to carbon dioxide and oxygen as the relative humidity is increased from 0 to 75 percent. However, in the case of glassine, which is also moisture sensitive, it was found that increasing the relative humidity had a tendency to reduce the permeability to carbon dioxide and oxygen.

Testing

NEW SANDPAPER ABRASION TESTER. F. M. Gavan, S. W. Eby, Jr., and C. C. Schrader. A.S.T.M. Bull. *1946*, No. 143, 23–29 (Dec.). An abrasion machine employing a continuously changing abrasive surface is described. It has been in use since 1941 in testing various flooring materials, synthetic resins, substitute rubber compounds, metals and painted surfaces. Essentially, the machine consists of two independent units: 1) a vertical track which carries the specially prepared specimens around to meet the abrasive, and 2) a carriage which rests on roller bearings and has provision for keeping a strip of sandpaper in continuous motion while abrading the sample. The directions of motion of the sandpaper and samples are opposite, and contact between the two is maintained by dead weights attached to the carriage by a cable-spring-pulley arrangement. Standard comparison specimens of zinc are tested with each run. Measurements taken on these standards over a period of years have shown the sandpaper to be reasonably consistent.

WATER-VAPOR-PERMEABILITY TESTER. F. T. Carson and V. Worthington. Paper Ind. Paper World *27*, 1799–1805, 1816 (1946). A new apparatus for measuring the water vapor permeability of sheet materials is described.

PREPARATION OF POWDERED MATERIALS FOR ELECTRON MICROSCOPY. M. C. Schuster and E. F. Fullam. Ind. Eng. Chem., Anal. Ed. *18*, 653–7 (Oct. 1946). A discussion is given of the basic problems involved in the preparation of powdered materials for electron microscopy, with special reference to effecting and maintaining an adequate dispersion of ultimate particles. Various tested methods are described for forming thin films of clear resins and for mounting dispersed powders on these films. Procedures are also given for dispersing and mounting powders suspended in resin solutions. The properties and applications of various resins and solvents are described and electron micrographs of several types of mounts are shown. These procedures for mounting particulate materials should be helpful for extension and refinement of the techniques of sample preparation for the electron microscope.

FALLING SAND ABRASION TESTER. C. C. Hipkins and R. J. Phair. A.S.T.M. Bull. *1946*, No. 143, 18–22 (Dec.). An investigation shows that the falling sand abrasion tester can be standardized and uniform results obtained. Close agreement was realized in several cases among various laboratories. It is necessary to insure uniformity of construction of the critical elements of the abrasion instruments to obtain comparable results among various laboratories. Some sections of the test method should be reworded to minimize the possibility of misinterpretation, precautions regarding the importance of properly aligning the apparatus should be added, and the permissible variation in rate of sand flow should be narrower than heretofore.

PACKAGING INSTITUTE STANDARD TEST METHODS FOR TENSILE STRENGTH AND ELONGATION. Modern Packaging *20*, 153, 170, 172 (Dec. 1946). A procedure for measuring the tensile strength and elongation of materials used in packaging is described.

BLOCKING RESISTANCE OF PAPER AND FLEXIBLE MATERIALS. Paper Trade J. *122*, 269–70 (June 13, 1946). This is TAPPI Tentative Standard Method T477 m-46 for determining the blocking resistance of sheet materials.

Synthetic rubber

CONTINUOUS PREPARATION OF BUTADIENE-STYRENE COPOLYMER. J. J. Owen, C. T. Steele, P. T. Parker and E. W. Carrier. Ind. Eng. Chem. *39*, 110–13 (Jan. 1947). The synthesis of butadiene-styrene copolymers by continuous methods was investigated.

CHEMICAL DERIVATIVES OF SYNTHETIC ISOPRENE RUBBERS. J. D. D'Ianni, F. J. Naples, J. W. Marsh and J. L. Zarney. Ind. Eng. Chem. *38*, 1171–81 (Nov. 1946). A process for cyclizing synthetic polyisoprene in the same way as natural rubber was developed to give a product which, for many applications, is equivalent to cyclized natural rubber. GR-S does not react under the same conditions. A process for chlorinating synthetic polyisoprene was developed which gives a product similar to chlorinated natural rubber with respect to chlorine content, viscosity, thermal stability, solubility and general utility in protective coatings and rubber-to-metal adhesives. GR-S cannot be satisfactorily chlorinated under the same conditions. Synthetic polyisoprene readily adds hydrogen chloride in a manner similar to natural rubber, whereas GR-S is practically unaffected. The product, however, does not have the excellent film-forming properties of Pliofilm. The striking similarity in chemical behavior of synthetic polyisoprene and natural rubber is attributed to the common chemical structure. The relative chemical inertness of GR-S is attributed to lack of a methyl group attached to double bond

DEVELOPMENT OF A BETTER PROCESSING GR-S. D. L. Schoene, A. J. Green, E. R. Burns and G. R. Vila. Ind. Eng. Chem. *38*, 1246–9 (Dec. 1946). A new GR-S type synthetic rubber was developed with improved processing characteristics. Among its advantages are low shrinkage, improved rugosity and surface appearance, smooth tubing, reduced swelling at extrusion dies and improved aging. These improvements are obtained by the use of small amounts of divinylbenzene during polymerization, and the resulting polymer is highly cross-linked.

PREPARATION, PROPERTIES OF RUBBERLIKE HIGH POLYMERS. C. Koningsberger and G. Salomon. J. Polymer Sci. *1*, 353–63 (Oct. 1946). Mixtures of butadiene and dimethylbutadiene with varying quantities of styrene and acrylonitrile were copolymerized under various catalytic conditions at 100° C. From solubility and swelling experiments it is evident that the polymers prepared from butadiene and the vinyl compounds and those from dimethylbutadiene and acrylonitrile are true copolymers. The mechanical properties of the copolymers from butadiene and increasing amounts of a vinyl compound change gradually from those of a rubber to those of the polyvinyl compound. The copolymers from a mixture containing 30 percent styrene or acrylonitrile are very similar, respectively, to Buna S and Perbunan. Copolymers of the same composition from dimethylbutadiene and acrylonitrile, on the other hand, form a new class of thermoplastics which will have a very much higher temperature of elasticity.

EFFECT OF VARYING MONOMER RATIO AND CONVERSION ON GR-S TYPE COPOLYMERS. E. D. Maher and T. L. Davies. Canadian Chem. & Process Ind. *30*, 43–6, 86 (Aug. 1946). For best properties, the composition of copolymers of the GR-S type should be kept uniform throughout and the molecular weight should be as narrow as possible. The present GR-S, or a polymer with a slightly higher butadiene content and lower conversion, will be used for tires and similar applications where high resilience and low brittle point are of paramount importance. For most mechanical goods, including the majority of the light colored stocks, a high styrene polymer (containing about 40 percent combined styrene) with a non-staining antioxidant will be employed.



AT SUBSTANTIAL SAVINGS OVER CONVENTIONAL METHODS

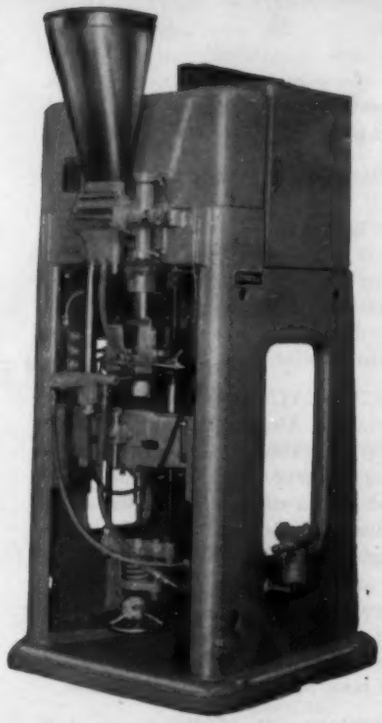


When this three-way switch was put into production, both conventional molding methods and Completely Automatic Molding were investigated.

Analysis of all cost figures led to the selection of Completely Automatic Molding on many counts—lower mold cost, more quickly into production, minimum labor and finishing costs.

With Stokes Completely Automatic Presses, cycles are reduced through split-second timing. Flash losses are reduced 8% to 10% and more. Mold costs are low because few cavities do the work of many. Production design changes can be made quickly and economically. Molded parts are uniform, of highest quality, always accurate.

Investigate Completely Automatic Molding.



F. J. STOKES MACHINE COMPANY • 5934 Tabor Road, Philadelphia 20, Pa.

F.J.Stokes MOLDING EQUIPMENT FJS Est. 1895

U. S. Plastics Patents

Copies of these patents are available from the U. S. Patent Office, Washington, D. C., at 25 cents each.

FLAME COATING. M. L. Macht and M. M. Renfrew (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,410,225, Oct. 29. A surface is coated with a dense resinous layer by feeding into a flame-spraying device together with a fuel gas and oxygen, an organic thermoplastic material in the form of particles passing a 50-mesh screen but retained on a 200-mesh screen, comprising a mixture of polyvinyl acetate, polyvinyl alcohol, polyvinyl butyral, fusible ethylene polymers containing cyclorubber and methyl methacrylate polymers, said particles impinging upon the sprayed surface while in the molten state.

RESINS. H. J. Richter and H. S. Rothrock (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,410,305, Oct. 29. A resinous composition comprising a polymer of an ester of an organic acid such as carbonic acid or an orthocarboxylic acid, in which ester at least two of the constituent alcohol residues contain aliphatic unsaturation in the alpha, beta position with respect to the carbinol group.

MOLDING. H. A. Storch. U. S. 2,410,312, Oct. 29. An apparatus for molding, from plastic material, elongated articles of revolution of the kind having a body which includes both stem and shoulder portions.

NITROCELLULOSE. H. von Kohorn. U. S. 2,410,319, Oct. 29. Nitrocellulose having a high and stable nitrogen content is prepared by dissolving cellulose according to the viscose method and precipitating in a bath containing two-thirds sulfuric acid, one-fifth nitric acid and balance water.

ELECTRICAL CONNECTOR. W. S. Watts (to Aircraft-Marine Products, Inc.). U. S. 2,410,321, Oct. 29. An electrical connector of the type intended to be crimped onto a wire and including a soft metal ferrule and a normally rigid tube of tough and stiffly flexible insulating plastic material which tightly embraces the ferrule, covers the outer surface thereof, and exhibits resistance to cold plastic flow similar to that of the metal whereby ferrule may be crimped against tube.

MOLDING. R. H. Windsor and E. Gaspar. U. S. 2,410,324, Oct. 29. A machine for the molding of thermosetting materials.

FABRICATION. A. W. Prance (to Briggs Manufacturing Co.). U. S. 2,410,361, Oct. 29. Plastic articles are prepared by applying an inked design or pattern to the surface of a cellulosic sheet, drying the ink, treating the sheet with a thermosetting resin in an intermediate stage to leave a coating over the pattern, preforming the sheet in a press to approximately the shape desired, heating and finally forming in a second press.

RESINOUS COMPOSITION. L. Smidth (to Sylvania Industrial Corp.). U. S. 2,410,395, Oct. 29. A composition comprising an incompletely reacted acid-curing synthetic resin combined with a latent curing catalyst comprising an olefin-sulfur dioxide polymer.

ADHESIVE. C. W. Johnson (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,410,414, Nov. 5. A resinous composition comprising a homogeneous mixture of a polyvinyl acetal in which the hydroxyl content is between 10 and 20 percent and an organic complex of the Werner type in which a trivalent chromium atom is coordinated with a carboxylic acido group having at least 10 carbon atoms.

ALKYD RESINS. L. Auer. U. S. 2,410,418, Nov. 5. A process for altering the properties of long oil alkyd resins comprising incorporatiag *p*-toluenesulfochloride and heating to a temperature between 260° C. and the boiling or decomposition point of the mixture until an appreciable increase in viscosity is obtained.

ABRASIVE. H. P. Kirchner and A. L. Ball (to Carborundum Co.). U. S. 2,410,506, Nov. 5. A coated, abrasive, waterproof belt comprising a backing consisting of a layer of flexible resilient leather having a pore-stopping sizing coating on one surface and being waterproofed on its outer surface, a single layer of abrasive on the sized surface comprising a substantial amount of diamonds and a grain bonding coat of a cured phenol-aldehyde waterproof resin.

MOLDING. N. Lester (to Lester Engineering Co.). U. S. 2,410,510, Nov. 5. Apparatus for the molding of thermoplastic material.

POLYMERS. D. W. Huebner and J. E. Fearey (to Imperial Chemical Industries, Ltd.). U. S. 2,410,605, Nov. 5. An interpolymer of isobutylene and methyl acetylene is prepared by subjecting a mixture to the action of boron trifluoride at a temperature of −10° C.

RUBBER TACKIFIER. S. A. Ballard and J. A. Perona (to Shell Development Co.). U. S. 2,410,623, Nov. 5. A tacky composition comprising a diene hydrocarbon rubber admixed with a resin prepared by condensing a single aldehyde in the presence of a condensation catalyst with a crotonaldehyde type of auto-condensation product of a lower aliphatic ketone.

COATING. M. Salo and H. F. Vivian (to Eastman Kodak Co.). U. S. 2,410,685, Nov. 5. A non-blocking hot-melt coating consisting of a cellulose acetate butyrate and a mixture of butyl stearate and a phthalate such as dicapryl-, diethoxyethyl- or dibutoxyethyl phthalate.

SILOXANE RESINS. A. L. Jenny (to General Electric Co.). U. S. 2,410,737, Nov. 5. A composition comprising a methyl-polysiloxane resin containing from 5 to 90 percent lead monoxide and, as a filler, magnesium titanate.

VINYL HALIDES. F. W. Cox and J. M. Wallace, Jr. (to Wingfoot Corp.). U. S. 2,410,775, Nov. 5. A vinyl halide resin comprising a polymer of a vinyl halide and a polymerizable mono-olefinic compound, and a color stabilizer comprising aminoguanidine or a salt thereof.

HOLLOW ARTICLES. E. Gronemeyer and S. Cherba. U. S. 2,410,936, Nov. 12. A hollow object is prepared by immersing an expansible hollow core in a mass of settable plastic in the liquid state which adheres to said core, withdrawing the core and incorporating in a hollow mold a portion of the core, expanding said portion to the form of the mold, allowing the plastic to cure and finally removing the molded article.

SELF-HEATING CONTAINER. M. Sanz (to Consolidated Vultee Aircraft Corp.). U. S. 2,411,116, Nov. 12. A container forming material comprising a self-healing intermediate layer formed of masticated partially cured rubber having a high degree of cohesiveness, but no tackiness and a uniformly dispersed admixture of a synthetic resin such as glycol-sebacate or glycerol-phthalate, an outer layer of tough highly elastic vulcanized rubber and an inner layer of synthetic rubber which is insoluble in hydrocarbons.

POLYAMINE RESINS. C. E. Adams (to Standard Oil Co.). U. S. 2,411,141-2, Nov. 19. A polyamine resin is prepared by reacting a mixture of a poly(halo-alkyl) aromatic hydrocarbon substituted in the nucleus, with a concentrated aqueous ammonia solution sufficiently concentrated to avoid hydrolysis of the poly(haloalkyl) aromatic hydrocarbon in the presence of a basic acid acceptor at a temperature below



Model 2R2A



Red Headed Ruggedness

IN HIGH FREQUENCY HEATING FOR PLASTICS

FROM the very beginning of our pioneering work, THERMEX high frequency dielectric heating units have been noted for electronic muscle—the *rugged* way they're engineered for years of good service.

Backed by outstanding experience, new Model 2R2A THERMEX Red Head for plastics preheating is rugged in even greater measure than before . . . from heavy-duty steel cabinet to features offering every possible protection against functional misbehavior. These include protection of tube filaments with constant voltage transformer—automatic grid control circuit—plate overload relay—dust tight covers for all relays, contactors, switches, and similar circuit components—properly air conditioned heating compartment.

Like all THERMEX Red Heads, Model 2R2A is portable and compact in relation to capacity. Occupies only 3¼ square feet. Heats 1½ pounds of general purpose plastic material from 80° F to a uniform 250° F in one minute. Accepts preforms up to 4¾ inches thick. Drawer-type heating compartment and automatic timer control makes it simple to operate. Keeps two presses busy with dual timers—can be started from press position if desired.

Write for information about the complete line of THERMEX Red Heads. The Girdler Corporation, Thermex Division, Louisville 1, Ky.

• • •

DISTRICT OFFICES

150 Broadway, New York City 7 • 228 N. LaSalle St., Chicago 1 • 1836 Euclid Ave., Cleveland 15

Thermex RED HEADS

THERMEX and RED HEAD—*T. M. Reg. U. S. Pat. Off.*

THE FIRST INDUSTRIAL HIGH FREQUENCY DIELECTRIC HEATING EQUIPMENT

480° F. and a pressure sufficient to maintain the reactants in the liquid phase, extracting the reaction mass with hot inert solvent and drying the extracted mass.

ADHESIVE SHEET. G. T. Turner and E. P. Wenzelberger (to Johnson and Johnson). U. S. 2,411,237, Nov. 19. Sheet material provided on one surface with a non-tacky coating characterized by softness, flexibility, resistance to scuffing, freedom from flaking, and the ability to withstand sterilizing temperatures, said coating comprising a polymeric reaction product of a terpene and maleic anhydride and a filler material.

MOLDING. G. H. Frank (to Western Electric Co., Inc.). U. S. 2,411,254, Nov. 19. A molding apparatus for molding thermosetting material.

YARN SIZING. V. R. Hardy and W. R. Haefele (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,411,322, Nov. 19. A slasher sizing composition for water-insensitive yarns comprising the reaction product of a linear polymer-forming composition comprising monoaminomonocarboxylic acids or a mixture of a diamine and a dibasic carboxylic acid, said sizing comprising a hydroxylated polyvinyl resin and a water-soluble condensation product of N-beta-hydroxyethyl urea, formaldehyde.

SODIUM CYANAMIDE—FORMALDEHYDE. J. F. Walker (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,411,396–7, Nov. 19. Condensation products of sodium cyanamide and formaldehyde are prepared by reacting said compounds in equimolar proportions in an aqueous alkaline medium below 25° C.

MOLDING. D. A. Wallace (to Chrysler Corp.). U. S. 2,411,398, Nov. 19. Plastic containers having tubular bodies are prepared by forming a cured tubular member, embracing said member between die members having complementary cavities, inserting a die into each opposite end, thereby defining a space, injecting molten plastic material into said space, solidifying under pressure, and severing said tube, thereby producing a pair of containers each having a closed end.

RESINOUS COMPOSITION. T. P. G. Shaw (to Shawinigan Chemicals Ltd.). U. S. 2,411,470, Nov. 19. A composition comprising exfoliated vermiculite, a thermoplastic resinous material and a volatile liquid vehicle is subjected to a kneading action and then dried and formed under pressure.

FILAMENTS. H. B. Stevenson (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,411,474, Nov. 19. An improved hydrolyzed ethylene-vinyl organic ester interpolymer filament is prepared by drawing at a temperature within the range of 80 to 100° C. in a medium containing water, heating the stretched filament to between 101 and 106° C. while in a taut condition and in the presence of water vapor.

LAMINATES. J. S. Barnes (to Skaneateles Boats, Inc.). U. S. 2,411,497, Nov. 26. Articles are prepared by molding formable material on a removable form by differential fluid pressure by providing a rigid form having a working surface of the desired shape, applying the formable material to the surface, covering with an air-tight pressure membrane of transparent, flexible sheet material so as to form an entirely enclosed space, said pressure membrane being constructed by joining together pieces of said sheet material in situ on the form, connnecting the enclosed cavity to a source of vacuum to draw the membrane against the formable material to permit inspection thereof, thereafter subjecting the formable material to a molding operation in which fluid pressure is applied to the outside of the membrane while the cavity is connected to a zone of lower pressure, and separating the molded article.

PLYWOOD TUBING. T. E. Ilch (to U. S. Plywood Corp.). U. S. 2,411,542, Nov. 26. An integral molded seamless tubing is formed from fibrous sheet material by introducing a number of layers of thermo-sensitive adhesive coated sheets of fibrous material into a rigid cylindrical casing until the layers are built up in tubular form against the interior surface of said casing, the layers being coiled individually and introduced endwise in succession into the casing and being allowed to expand in the casing and assume the contour thereof, applying a tubular membrane interiorly thereof and distending the latter by a heat and pressure medium sufficient to press the sheets against the interior of the casing to bond the sheets to each other and to mold said sheets to the configuration of the casing.

COATING. M. Riccitiello (to Westinghouse Electric Corp.). U. S. 2,411,554, Nov. 26. A liquid coating composition comprising a combination of pigment, a vehicle composed of unsaturated fatty acid modified alkyd resin, a solvent and a texturing material composed of finely divided material comprising fibrous material combined with thermoset phenol-formaldehyde resin.

PHENOLIC RESINS. C. H. Schuh (to Carbide and Carbon Chemicals Corp.). U. S. 2,411,557, Nov. 26. Phenol-formaldehyde resin is prepared by reacting two to three mols of formaldehyde with each mol of phenol in the presence of salicylic, ethyl salicylic, or butyl salicylic acid, heating the reaction mixture so as to conduct the reaction at a temperature just short of boiling without substantial reflux, arresting the heating within a short time after the initial appearance of water-insoluble resin, allowing the mixture to separate into layers and separating the resin layer.

CONTAINER. W. O. Manor (to Consolidated Paper Co.). U. S. 2,411,580, Nov. 26. A container wall comprising an outer layer of fibrous material, an inner dual coating layer comprising an undercoating, and a coating of methyl cellulose and starch.

VINYL COATING. G. M. Powell, 3rd (to Carbide and Carbon Chemicals Corp.). U. S. 2,411,590, Nov. 26. A vinyl resin coating composition of limited heat-reactive type comprising an acid-reacting vinyl resin such as a copolymer of vinyl chloride, a vinyl ester of a lower saturated fatty acid, and an aliphatic, α,β-olefinic carboxylic acid and a heat-reactive alcohol-soluble resin such as a urea-formaldehyde or melamine-formaldehyde resin, said composition being dissolved in an organic solvent.

POLYMERIZATION. W. J. Sparks and A. H. Gleason (to Standard Oil Development Co.). U. S. 2,411,599, Nov. 26. The process comprising mixing a methacrylate and an α-olefin in liquid form at room temperature and interpolymerizing the mixture by the application thereto of ultraviolet light.

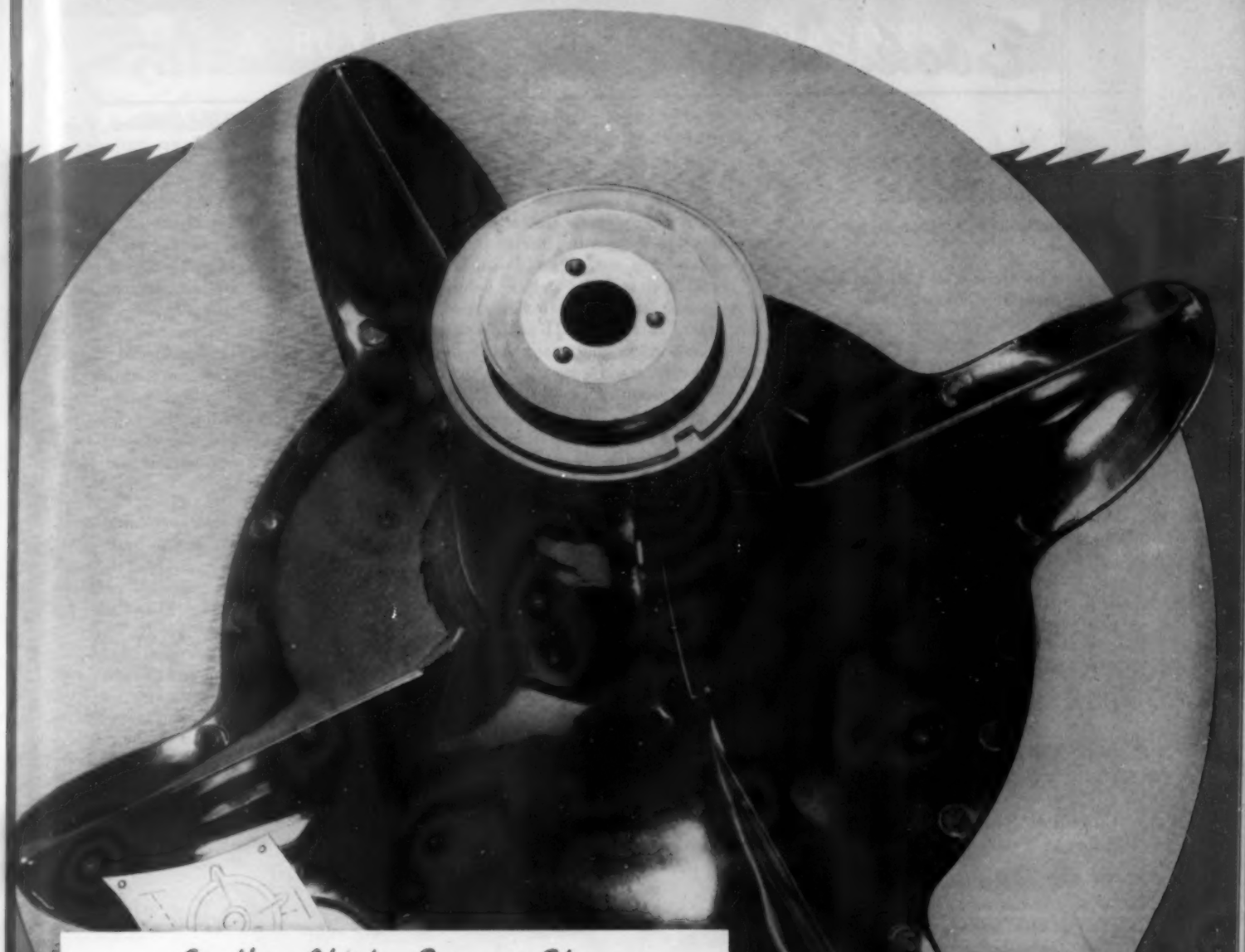
LACQUER. J. B. Monier. U. S. 2,411,665, Nov. 26. A lacquer base comprising an unsaturated cellulosic derivative obtained by treating a cellulosic ether, substantially free from hydroxyl groups, with hydrogen under pressure and then condensing with alcohol and an olefin, dehydrogenating by refluxing until unsaturation occurs, and a plasticizer incorporated by mixing therewith at 110 to 200° F. and holding under vacuum at 140 to 150° F. for 30 to 60 minutes.

MOLDING COMPOSITION. J. B. Monier. U. S. 2,411,666, Nov. 26. A molding composition comprising a cellulosic derivative resulting from hydrogenating a cellulose ether under pressure, condensing with alcohol and an olefin, dehydrogenating by refluxing, and adding plasticizer and filler at 110 to 200° F.

ABRASIVES. R. J. Hill (to Western Electric Co., Inc.). U. S. 2,411,724, Nov. 26. An abrasive element is prepared by extruding a soft tube of hardenable synthetic resinous material, applying abrasive powder to the outer surface only, pressing said powder into said tube by rolling, and hardening plastic material.

COMPOUNDING RUBBER HYDROHALIDES. W. C. Calvert (to Wingfoot Corp.). U. S. 2,411,839–40–41, Nov. 26. Homogeneous thermoplastic compositions are prepared for molding, calendering, etc. by milling a rubber hydrohalide with a substance to prevent heat disintegration, such substances being similar to litharge or sulfur.

AN AGITATING PROBLEM . . . *Molded in Plastics*



Another Plastic Success Story

A short time with this liquid agitator for industrial washing machines and the TECH-ART staff began to feel it was appropriately named . . . because its major molding problems certainly agitated *them* for a while.

First there was the mold itself — solid steel and a ton in weight. The problem of machining this ponderous piece called for special lathe jigs and milling tools. In just two weeks TECH-ART's skilled toolmakers and mold builders, meshing together like precision gears, had the necessary equipment set up and working to produce the mold. Then arose the perplexing problem of the proper plastic—because no specific agitator material had been developed up to that time. Working closely with a major raw material supplier, TECH-ART came up with a special phenolic that had high-impact strength, acid and alkali resistance, smooth finish . . . yet flowed quickly and evenly to every last corner of the large mold area.

When mold and materials were finally brought together in one of TECH-ART's huge 800-ton compression presses, the result was the agitator shown above . . . big, brawny, yet delicately balanced for perfect rotation . . . and another plastic success story by TECH-ART.

Why not let TECH-ART take the "agitation" out of *your* plastic product problems? There's a good chance you'll find the cure in TECH-ART's long years of molding experience—imaginative product engineering—knowledge of plastic materials—skilled mold building—and complete facilities for every type of molding. Talk it over with TECH-ART today.

TECHNICAL NOTES: The dimensions of this agitator are: height — 25", width — 15", weight — 15 lbs.

TECH-ART PLASTICS COMPANY

36th Ave. and 41st Street • LONG ISLAND CITY, N. Y. • Tel. AStoria 8-6050-1

SUCCESSORS TO BOONTON RUBBER MANUFACTURING COMPANY

PIONEER PLASTIC MOLDERS . . . Established 1891

Books and Booklets

Write directly to the publishers for these booklets. Unless otherwise specified, they will be mailed without charge to executives who request them on business stationery.

German Plastics Practice

by John DeBell, W. C. Goggin and W. E. Gloor

Published by DeBell and Richardson, Inc., Springfield, Mass., 1946

Price $7.50 **554 pages**

This book is a reprint and amplification of a limited Quartermaster Corps survey of German plastics which first appeared in 1945. Contained herein is an account of the industry as the authors found it during visits to most of the I. G. plants, molding, coating and cable plants just after V-E Day. Special emphasis is placed on such advances as caprolactam in synthetic fiber and sheet material; chlorinated polyvinyl chloride rot resistant fabric; carboxymethylcellulose to extend soap; oriented thin polystyrene sheet; improved rubber latex and short rubber polymerization; fungus resistant systems.

G.M.K.

Trade-Mark Act of 1946

by H. A. Toulmin, Jr.

Published by W. H. Anderson Co., Cincinnati, Ohio, 1946

Price $5.00 **224 pages**

The Lanham Act, described in this book, is the first comprehensive law enacted for the protection of trade-marks in the United States. The author, an authority on trade-mark law, discusses such vital features of the Act as the new grounds for cancellation of a mark, provision for separate registers and secondary meaning marks. New grounds for cancellation are: if the mark becomes the common descriptive name of a product or if the mark is being used to violate the anti-trust laws.

Plastics Applied

Edited by V. E. Yarsley

Published by The National Trade Press Ltd., Drury House, Russell St., London, W. C. 2, 1946

42 shillings net **528 pages**

Obviously intended to be a horizontal reference book on plastic materials and their applications both to consumer and industrial products, this book contains four sections. Section I presents an introductory article on the economics of the plastics industry in Britain considered against the background of the industry in America as presented in Modern Plastics. It also contains an article on design and one on color possibilities. Section II deals with applications. Rather than discuss any type of plastic and its possible application, this section deals with fields of application such as electric lighting, fancy goods, aircraft, ship building, furniture, etc. In Section III are discussed health and safety matters in connection with plastics manufacture. Section IV contains a group of useful tables giving characteristics of various types of plastics materials, as well as a material source list in which are included trade names. The book is thoroughly indexed.

Examination of Industrial Measurements

by John W. Dudley, Jr.

Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York City, 1946

Price $2.00 **113 pages**

This book acquaints the engineer with some useful, simple and adaptable statistical techniques for the detection of variation in industrial products. Important types of data which reveal causes of variation are discussed and effective methods for collecting, analyzing and presenting them are explained with special emphasis on broad industrial application.

Chemistry for the Executive

by Ralph K. Strong

Published by Reinhold Publishing Corp., 330 W. 42nd St., New York City, 1946

Price $6.00 **445 pages**

A practical and industrial review of chemistry is presented informally in this book. Beginning with the basic chemical elements and simple compounds, the author advances through the various inorganic materials to a discussion of hydrocarbons and synthetic materials. Each scientific term and equation is thoroughly explained and there is no necessity for any anterior knowledge for complete understanding of the subject.

Fundamentals of Plastics, 1st edition

Edited by Henry M. Richardson and J. Watson Wilson

Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York City, 1946

Price $4.00 **483 pages**

This book is a compilation and expansion of lectures presented at a plastics course conducted at New Haven YMCA Junior College. Authorities in various phases of plastics supplied information for the book which is divided into four parts. The first deals with certain fundamentals regarding the relationship of chemical structure to physical properties. The six classes of plastics are discussed in the second section. Commercial methods used in the manufacture of plastic products are covered in the third portion while the last section deals with the evaluation of plastics, including measurement and manufacturing control.

Injection molded and extruded plastics—A catalog combining the visual attractiveness and practicality of the products reproduced on its pages, has just been published by the Elmer E. Mills Corp., 153 W. Huron St., Chicago 10, Ill. The injection molding and extrusion of thermoplastics are treated and lavishly illustrated with plant and product photographs. The characteristics, uses and formulations of those materials molded by the corporation are included, as are technical data on Mills plastic tubing.

Merchandise displays—Various See-All plastic merchandise displays of carved and fabricated Plexiglas, are illustrated and cataloged in a brochure just released by W. L. Stensgaard & Associates, Inc., 346 N. Justine St., Chicago 7, Ill.

Ion-exchangers—A brochure has been received from the Chemical Process Co., 58 Sutter St., San Francisco 4, Calif., explaining Duolite ion exchangers. The properties and uses of Duolite exchangers, synthetic resinous materials into which the properties of good exchange capacity, stability, physical strength and good flow characteristics have been built, are given.

Chlorinated rubber—A new technical book has recently appeared, discussing the properties and uses of Parlon, the chlorinated rubber product of Hercules Powder Co., Wilmington, Del. Parlon finishes covered include alkyd enamels, finishes for alkaline surfaces, paints resistant to chemicals, varnishes, traffic paints and marine finishes.

Adhesives—A symposium on adhesives, issued by the A.S.T.M., comprises seven papers discussing the types and uses of adhesives, a general theory of adhesion, strength properties, analytical procedures used on adhesives, permanence tests of bonds, adhesive working qualities and the

A BUYING GUIDE FOR ABRASIVES

POINT No. 2

INFORMATIVE LITERATURE



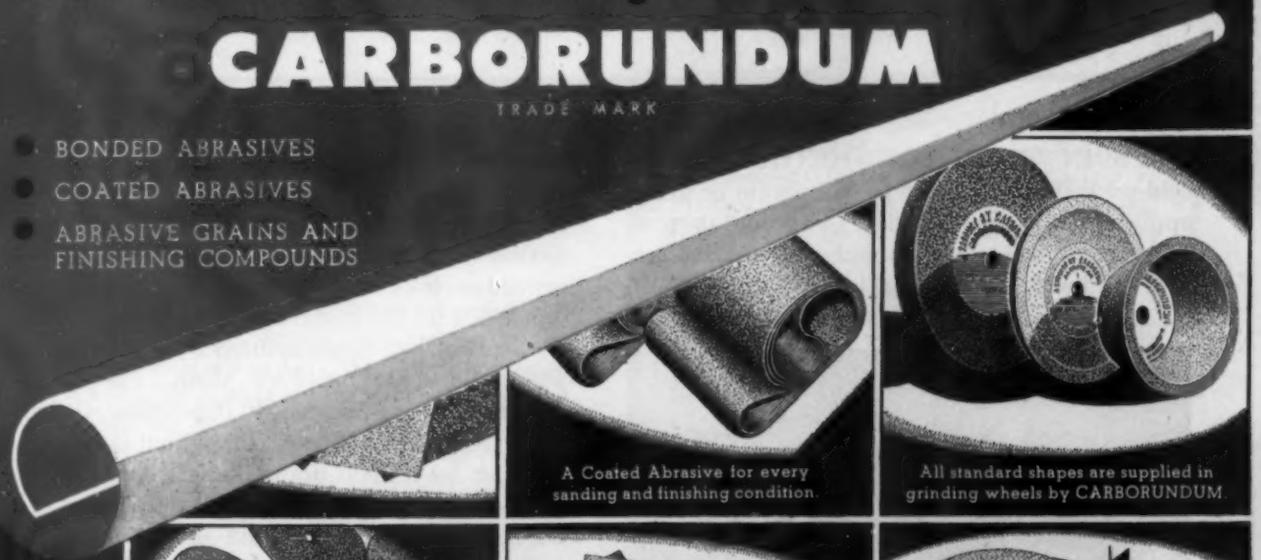
Being so closely identified with the development and progress of abrasives, it is natural that The Carborundum Company should be the source of so much authoritative literature on their application, care, and handling. Certain highly successful concerns regard the helpful service of technical and engineering literature supplied by The Carborundum Company as a significant point in their preference for abrasives by CARBORUNDUM. Ask your Carborundum representative for literature and bulletins related to your own grinding and finishing operations. The Carborundum Company, Niagara Falls, New York.

A Good Rule for Good Grinding...CALL IN

CARBORUNDUM

TRADE MARK

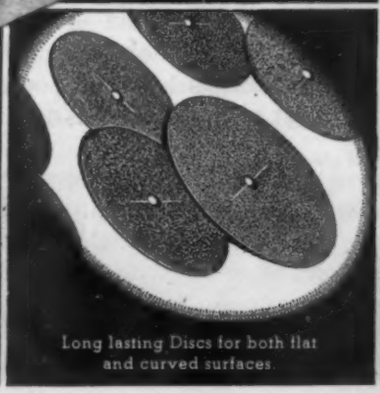
- BONDED ABRASIVES
- COATED ABRASIVES
- ABRASIVE GRAINS AND FINISHING COMPOUNDS



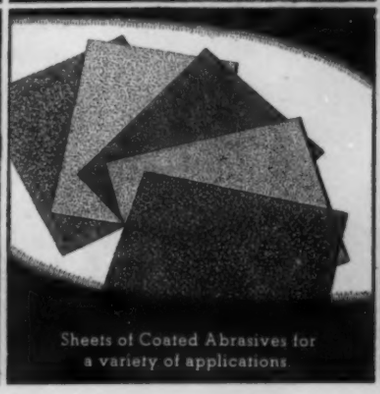
A Coated Abrasive for every sanding and finishing condition.

All standard shapes are supplied in grinding wheels by CARBORUNDUM.

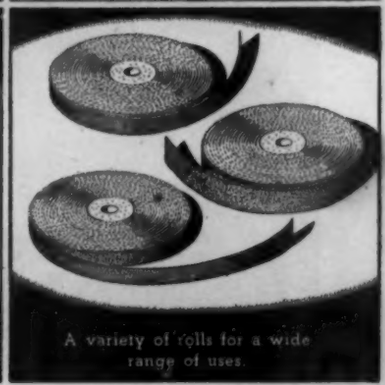
"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company



Long lasting Discs for both flat and curved surfaces.



Sheets of Coated Abrasives for a variety of applications.



A variety of rolls for a wide range of uses.

preparation and use of specifications for adhesives. This symposium may be obtained at a cost of $1.00 on request to the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Also available is a paper on "The Theoretical Basis of Adhesion," which may be procured in reprint form, from the above address, at $0.50 per copy.

Sugar and sugar by-products in plastics—Sugar Research Foundation, Inc., 52 Wall St., New York City, has compiled a series of Scientific Reports which are designed to describe current uses and applications of sugar and its by-products in other very closely related technologies and industries.

This new series of publications was inaugurated with a review of "Sugar and Sugar By-Products in the Plastics Industry." Sucrose, a potential raw material for the formation of colored and colorless plastics of either the phenolic or alkyd type, and application of such other acids as aconitic, levulinic, citraconic and itaconic are discussed and evaluated. Another closely related booklet, is an annotated bibliography dealing with the utilization of sugar cane bagasse in the manufacture of plastics, chemicals, paper and board.

Heating system—The advantages of electricity and Dowtherm heating are combined in the Blaw-Knox Electro/Vapor heating system. This improved method of heating application for chemical process vessels is described in Bulletin 2083 which is available from the Blaw-Knox Co., P. O. Box 1198, Pittsburgh, Pa.

Draw-in collets—A new bulletin, No. 46, presenting full information on Hardinge draw-in collets for all lathes and millers and on Hardinge-Sjogren collet chucks, is now available from Hardinge Brothers, Inc., Elmira, N. Y. A reference list greatly simplifies collet ordering and will be valued by the purchasing as well as the engineering departments.

Fiber bonded processes—Dan River Mills, Inc., Danville, Va., has just issued a 32-page booklet on the "Fiber Bonded Processes." Illustrations of the newest models of machinery, verbatim copies of the patents and the license agreement are all included.

Materials table—A materials table, listing the general properties and uses for molded plastics, has been published by the Shaw Insulator Co., Irvington 11, N. J. All of the common materials are included, together with typical applications as a guide to selection.

Copper-base alloys—A comprehensive compilation of welding and composition information relating to copper-base alloys has been issued by Ampco Metal, Inc., 1745 38th St., Milwaukee 4, Wis. This 19-page list gives trade names, manufacturers and the chemical composition of most of the established copper-base alloys, together with data on the degree of weldability, preheats, type of electrodes or rods recommended and the preferred welding process for each type.

Pulverizers and atomizers—A catalog describing the complete line of Mikropulverizers and Mikro-atomizers, from the small Sampler and Bantam models for laboratory and pilot plant use to the large capacity units for full-scale production operation, has just been published by the Pulverizing Machinery Co., Chatham Rd., Summit, N. J. Basic principles and details of design and construction of both machines are presented, as well as various modifications available for special conditions of operation.

Standardized inserts and studs—Of special interest to the die-casting industry is this new catalog put out by U. S. Engineering Co., 521 Commercial St., Glendale 3, Calif., which lists standardized, molded-in inserts, and studs, specifically designed and engineered to meet the demands of industry as a whole.

Solvents, alcohols, extenders—The third edition of "Solvents Alcohols E tenders" has been prepared by the t nical staff of The C. P. Chemical Solv Inc., 60 Park Place, Newark 2, N. The characteristics and uses of various alcohols, ketones, esters, industrial petroleum naphthas, and other solvents, alcohols and extenders are given in this third edition.

IT'S IN THE BAG—WHETHER ITS A cold-pack that you want for a migrain or a hot application for tired muscles. This dual purpose Perma-Seal bag can be used for either cure. It is filled with a liquid that is readily turned into slush when stored in the refrigerator for half an hour or is heated when dropped into a teakettle of boiling water for a short time. Because of its flexibility and shape, the bag can be draped around parts of the body or beneficially arranged.



A 0.004 in. thick vinyl sheeting is used for the Perma-Seal bag manufactured by Alden Electro Plastic Co. of St. Louis Park, Minn. The material is laid on cutting tables in 40 ft. lengths. Because of the accurate cutting of curves that is required, it is cut by a hand drawn knife. After the cut pieces are put through a folding machine, the edges are electronically sealed—except for a small oriface—by machine. The sealing of the oriface is left until the solution has been poured into the bag. This last sealing process is done by a short bar seal.

The material can be stretched and pulled, yet will return shortly to its original shape. Acids, alkalis, gasoline, oil, grease, alcohol, perspiration and elements of weather do not adversely affect the material.

A NATURAL COMBINATION

Plexene M

New modified styrene co-polymer molding powder. Resistant to weathering. Distinguished for toughness. Economical to use.

Plexiglas

Permanently crystal-clear acrylic plastic. Light, strong, shatter-resistant. Easily molded or fabricated.



Here's a *new* combination in the field of transparent plastics . . . the combination of long-established PLEXIGLAS with the recently introduced PLEXENE M.

For full-vision transparency, undimmed clarity, or the ultimate in eye-catching sparkle, it's PLEXIGLAS, of course.

For all applications that do not require the crystal clarity of this acrylic plastic, turn to the more economical PLEXENE M . . . a modified styrene co-polymer that resists weather, heat and gasoline. In its natural form, PLEXENE M is a transparent, pale straw color. It may be dyed or pigmented in a wide range of transparent, translucent and opaque shades.

Here's the combination at work

In these new folding safety goggles made by Watchemoket Optical Co., Inc., Providence, R. I., PLEXIGLAS is used for the optically clear, non-distorting, high-impact-strength lenses. Lower-cost PLEXENE M is molded into the strong, tough, lightweight frames.

Get the full details on PLEXENE M . . . plan to use it freely in its natural combination with PLEXIGLAS! Call or write our nearest office: Philadelphia, Los Angeles, Detroit, Chicago, New York . . . Canadian Distributor: Hobbs Glass, Ltd., London, Ontario.

Only Rohm & Haas makes Plexiglas sheets and molding powders and Plexene M molding powders.

PLEXIGLAS *and* PLEXENE *are trade-marks, Reg. U.S. Pat. Off.*

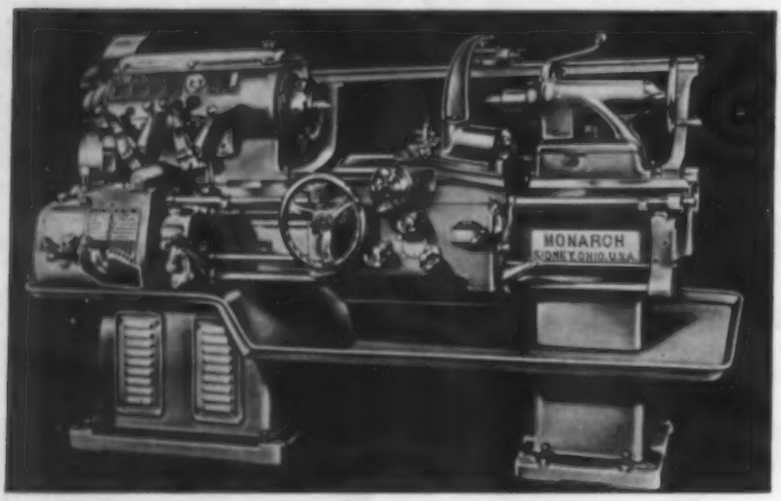
Represented by Cia. Rohm y Haas, S. R. L., Carlos Pellegrini 331, Buenos Aires, Argentina, and agents in principal South American cities.

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Manufacturers of Chemicals including Plastics • Synthetic Insecticides • Fungicides • Enzymes • Detergents
Germicides • Chemicals for the Leather, Textile, Ceramic, Rubber, Paper, Petroleum and other Industries

New Machinery and Equipment



Air-tracer—An air-tracer with a hydraulically operated power circuit to produce work pieces on a lathe with contours which match those of a master template within a limit of tenths has been developed by the Monarch Machine Tool Co., Sidney, Ohio. It is shown here attached to an engine lathe. Since the motion of the cutting tool is stepless, increasing contours can be produced with a finish heretofore difficult to achieve. It may be used for any increasing contour or multiple diameter work. It is suited for work on mandrels, punches, dies, spinning chucks, valves, metering pins, nozzles, impellers, molds and step shafts. Diameters, tapers, square shoulders, necks and radii on a step shaft may be turned in a single cut.

Thin metal templates may be used as pressure of the tracer against the template is only a few ounces. When certain types of straight shaft work are being turned, a master work piece, held between centers attached to the template support, may be used. Air loading pressure of 35 p.s.i., established by the air tracer, controls the operation of the tool slide through the hydraulic relay valve.

The slightest change in template shape increases or decreases the air loading pressure by changing the rate of flow from the air tracer valve. Instantly, the amount of tracer movement from its balanced position is amplified into hydraulic relay valve motion in a ratio of 1 to 100. Air loading pressure is again restored to balance as the tool slide moves in the direction and to the extent of the template variation.

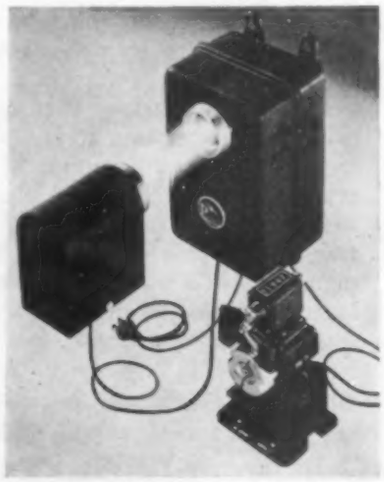
Actuation of the hydraulic relay valve is through the medium of a flexible metal bellows. The lathe carriage is moved by the usual power or handwheel feed. The tool slide is set at a 45° angle. Position of template support is adjustable along rail.

Knee type milling machine—Childs & Co., Conneaut, Ohio, has announced Model No. 0000 knee type milling machine. This small low-cost miller is designed for manufacturers of small parts, tool and die shops, instrument makers and laboratories, experimental shops, vocational schools, fabricators of electrical and electronic devices, etc. Capacity is indicated by the following feeds: longitudinal 6 in., transverse 1⅓ in. and vertical 4 inches. Movement of the table in transverse, longitudinal and vertical directions is held to 0.001 in. in accuracy. A 0.0001 in. tolerance applies to run-out of the spindle. It may be used for bench or table model operation or when used with an accessory pedestal base provides a floor-type milling machine. Nine changes of speed are available. The countershaft assembly, available in the pedestal base, provides speeds from 280 to 11,150 r.p.m. Four adjustable dials have knurled locking screws and are graduated in 100 graduations, each graduation being 0.001 inch.

Six-ton capacity air hydraulic press—Air-Hydraulics, Inc., 401 Broadway, New York City, announces the addition of a 6-ton capacity model air hydraulic press to their present line of 2½-ton capacity models. This press, in bench or floor models, can be used for assembly, riveting, embossing, staking, sizing, crimping, flanging on plastics, metals and leathers. It can be plugged into the present airline: the 2½-ton model working on a 50 to 1 ratio on the air intake pressure; the 6-ton model working on a 120 to 1 ratio. Ram speed is adjustable from the slowest action to 300 i.p.m.; the stroke is adjustable from 1/16 to 5 inches.

Hydraulic pump—Superdraulic Junior, a hydraulic pump developing 5000 p.s.i. and weighing 35 lb., has been announced by the Superdraulic Corp., Miller at Ford Rd., Dearborn, Mich. Practically a duplicate of Superdraulic 40-hp. constant delivery pump on a reduced scale, the pump is 6 in. in diameter and 11 in. long. The single bank of plungers delivers 3 gal. per min. at 1800 r.p.m. and 2 gal. per min. at 1200 r.p.m. The pump is particularly adaptable as a holding pump for plastic presses and injection molding machines.

Photoelectric counter—A general purpose photoelectric counter, Type P1, consisting of a photoelectric control, light source and electric counter, has been announced by Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass. It is recommended for high speed counting in can and box manufacturing, selective counting by height or length, for remote counting, for



counting on loading chutes and conveyors, for counting small objects, freshly painted or hot objects, textile piece goods, leather goods, glass tubes and bottles and for counting the output of punch presses and screw machines. It has an operating range of 6 ft. and can count up to 600 items per

"MAKE MINE KLINE"



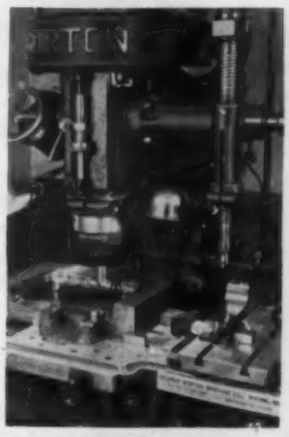
WHERE ELSE WILL YOU FIND THIS COMBINATION?

A PLASTIC PRODUCT IS ONLY AS GOOD AS ITS MOLD

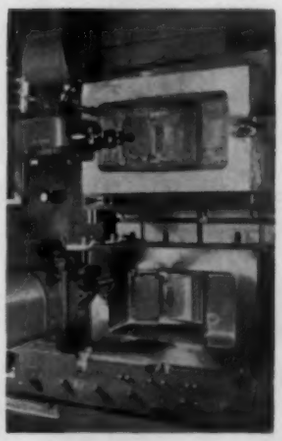
That's why some of the biggest names in plastics demand a Kline mold. Clean, sharp products result from Kline molds, a sure way to get ready customer acceptance.

Plastic products must meet today's high competitive standards. You'll put the stamp of approval on a Kline mold produced by skilled machinists working with the most modern precision machinery. Join us in being proud of products produced by Kline molds.

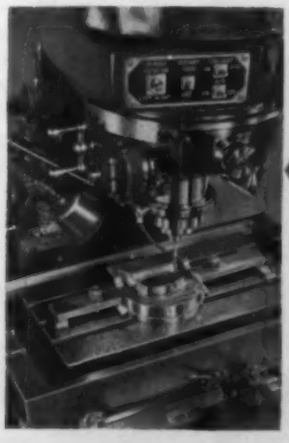
Your shop foreman knows it takes skilled men plus the most modern equipment to produce good molds. Kline can meet both these specifications. In many shops you find one of the machines illustrated. A few have two, but seldom will you find all.



Cavity section for a well-known radio cabinet being cut on our Gorton Duplicator.



One of our Pratt and Whitney Kellers cutting a cavity for an electric adding machine cover.



Cherrying mold for circuit breaker handle on our Kearney & Trecker Die Miller.

KLINE OFFERS VALUABLE EXPERIENCE IN MODELS AND RESEARCH. WRITE US ABOUT YOUR PROBLEM.

THE KLINE MANUFACTURING CO.

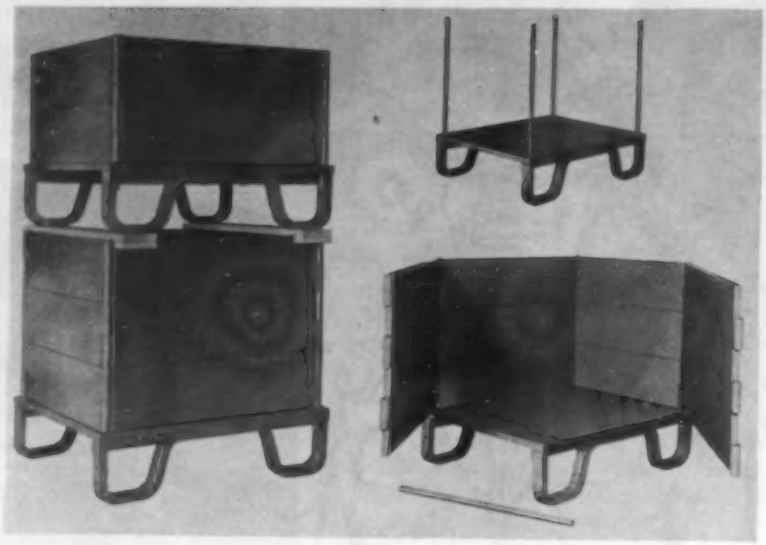
GALENA, OHIO

minute. Its maximum number of counts before returning to 0 is 99,999. The control has a line cord with a male plug connection which was made to fit any standard lighting outlet.

Self-contained hydraulic hobbing press—M & N Machine Tool Works, 161 Orono St., Clifton, N. J., announces a self-contained hydraulic hobbing press in capacities ranging from 30 to 400 tons. This press can be used for blanking, forming, drawing of heavy materials, for testing material for compression experimental work on plastics, rubber and powder metallurgy. Once the controls are set, and regardless of the number of times the press is in operation, the pressure will remain constantly at the predetermined level. Devoid of platen, the press is constructed to permit the use of hardened steel pressure disks for hobbing purposes. Six models are available: 30-ton capacity; 200-ton capacity with hand pump, height 63 in.; 200-ton capacity with single pump, height 72 in.; 400-ton capacity with dual pump, height 72 in.; 400-ton capacity with hand pump, height 63 in.; 400-ton capacity with dual pump, dual gage and dual gage controls, height 72 inches. Specifications



for M13AS1M 400-ton press shown here are: ram diameter 13 in.; opening between rods left to right 11 in., front to rear 18 in.; daylight opening 12 in.; column diameter 3¼ in. and a maximum stroke of 4½ inches.



Collapsible metal box for skid platforms—Market Forge Co., Everett, Mass. is now manufacturing a new type of collapsible metal box for use with skid platforms. The skid platforms are provided with sockets to receive 1-in. standard pipe (corner posts). All steel panels for the sectional boxes are 12 in. high and have loops of steel which engage with pipe stakes in the platform. They are then slipped over the pipe stakes and may be built up to any height. It is possible to equip the skid platform with one, two, three or four sides. It is also possible to leave out any portion of a side or end for ease in loading and unloading material.

Steel plate industrial fans—Sprout, Waldron & Co., Muncy, Pa., is now manufacturing belt and motor driven steel plate fans which are particularly adapted to the handling of materials by air—dust and chemicals, for example. For applications where abrasive materials are handled, the company supplies a tough abrasion resistant liner insert which prolongs the life of the housing. The direct connected motor applies 100 percent power to the fan impeller and eliminates cost of fan shaft, bearings, V-belt drive, adjustable motor base and common base for fan and motor. Capacities can be raised or lowered by simply furnishing impellers of different diameters. Sixteen positions of discharge are possible and assembly may be furnished clockwise or counter-clockwise. In event of accidental over-feeding, four removable thumb screws permit quick cleaning. A new bulletin, F-946, describing these fans is now available.

Laboratory oven—A laboratory oven which equalizes interior heat by a double venting device has been developed by the K. H. Huppert Co., 6830 Cottage Grove Ave., Chicago, Ill. Designed for use in chemical laboratories doing precipitation, ash content and similar general chemical laboratory work, steel drawings, etc., this Model 5700 oven features thermostatically controlled temperatures from 0 to 550° F., with an added timing device. The vents, which serve to equalize heat, also remove obnoxious or unwanted fumes and gases. A third, smaller vent, permits entrance of thermometer into the heat chamber. The oven interior is lined with steel and a baked aluminum surface, and measures 20 by 15 by 19 inches. It consumes 2800 watts at 110 volts AC or 220 volts single phase. Door latches are explosion-proof.

Multiple spindle drilling attachment—An eight-spindle adjustable drill head which can be attached to any drill press



has been announced by the Commander Mfg. Co., 4225 W. Kinzie St., Chicago 24, Ill. It will drill eight holes at one stroke in any hole pattern on or within a 9-in. circle; minimum center distance is ½ inch. Positioning is accomplished by loosening one nut on each of the eight locating arms, positioning the spindle and finally tightening the nut again.

High-pressure hydraulic pump—A hydraulic pump for operating pressures up to 1500 p.s.i. intermittent or 1200 p.s.i.

THE AMAZING NEW
ELMES HYDROLAIRS

Patents Applied for



30-ton Bench-Type
(Also made in 20-ton)

FAST, POWER-OPERATED PRESSES THAT ARE *Pumpless, Motorless!*

Big savings for small-press users! Low purchase price. Simple installation. Speedy performance. Power costs only about *one-fiftieth* of a penny per average cycle, because Hydrolairs have no pumps or motors. They operate entirely from the shop air line. Just connect them up, and they're ready to go.

They Turn Out a Lot of Work. Effortless lever control governs both quick closing and *instantaneous* full pressure. Hydrolairs apply and maintain the selected pressure, and *repeat* at that pressure until reset. They're ideal for molding plastics and rubber, for laminating, for repetitive compression tests, and for every other pressure purpose.

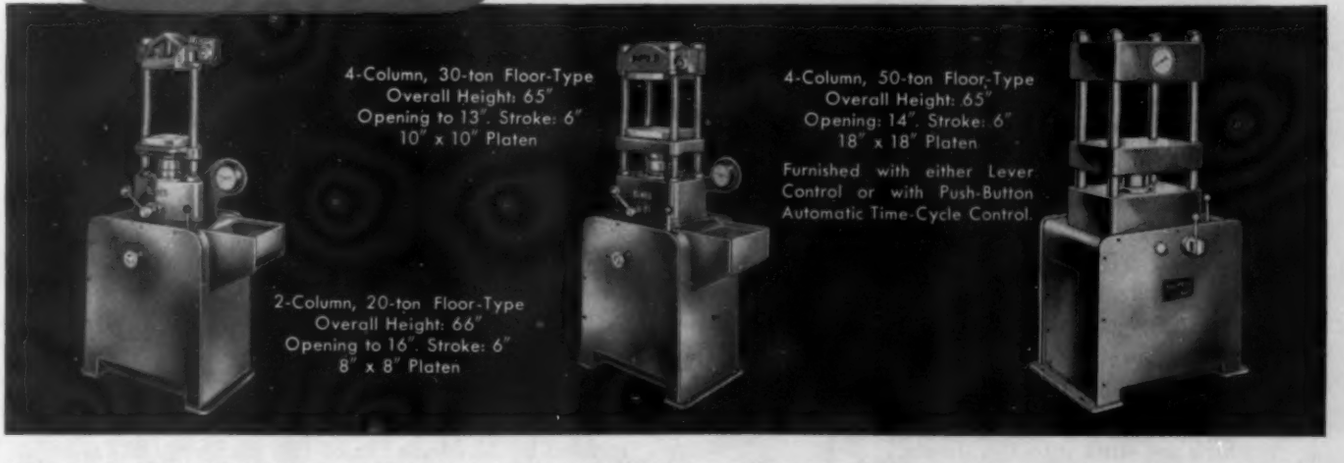
You Can Increase Your Profits. Write today for new Bulletin 1036. It tells the whole story about this *amazing* hydraulic principle; gives uses and complete specifications on the full line of bench- and floor-type models. For pressures up to 50 tons, new Elmes Hydrolairs are the presses to buy.

ELMES

Since 1851

HYDRAULIC EQUIPMENT

20-, 30-, AND 50-TON FLOOR-TYPE HYDROLAIRS



2-Column, 20-ton Floor-Type
Overall Height: 66"
Opening to 16". Stroke: 6"
8" x 8" Platen

4-Column, 30-ton Floor-Type
Overall Height: 65"
Opening to 13". Stroke: 6"
10" x 10" Platen

4-Column, 50-ton Floor-Type
Overall Height: 65"
Opening: 14". Stroke: 6"
18" x 18" Platen

Furnished with either Lever Control or with Push-Button Automatic Time-Cycle Control.

ELMES ENGINEERING WORKS *of* AMERICAN STEEL FOUNDRIES, 225 N. Morgan St., Chicago 11, Ill.

METAL-WORKING PRESSES · PLASTIC-MOLDING PRESSES · EXTRUSION PRESSES · PUMPS · ACCUMULATORS · VALVES · ACCESSORIES

continuous, has been developed by the Gerotor May Corp., Maryland Ave. & Oliver St., Baltimore, Md. This pump, Type QH, is available in capacities of 3, 5, 8 and 12 g.p.m. for plain base or flange mounting. Standard design speed is 1200 r.p.m. and standard rotation is clockwise facing the shaft end.

All-purpose band saw—The Livingston Mfg. Co., South Gate, Calif., has announced a new heavy duty band saw, Model 140, which can be used for metals as well as plastics and wood. The vertical cutting clearance is 10 in. in depth while the horizontal measure is 13¾ inches. Installation of the blade at the back of the saw unit assures operator protection of a permanent frontal guard at all times. Double shielded ball-bearing guides, mounted on eccentrics, can be adjusted to any type or size blade up to and including ¾ inch. The tilt table of cast iron is precision ground to 0.005 in. and is 17 in. long and 20 in. wide.

Abrasive cut-off wheel—American Emory Wheel Works, Richmond Square, Providence 1, R. I., has introduced a new Ripper abrasive cut-off wheel for use on portable and cut-off machines. This wheel has a set which allows it to cut cooler and faster, and last longer. The sides are made with radial depression 0.006 to 0.008 in. deep, extending from the flange area to the edge of the wheel. The 6-in. wheel has a minimum thickness of 1/16 in. while the 8, 10 and 12 in. sizes have minimum thickness of 3/32 inch. The wheels are made in sizes 6 to 12 in. in diameter and in grit and grade to cut all type of materials.

Variable speed polishing and buffing lathe—Hammond Machinery Builders, Inc., 1600 Douglas Ave., Kalamazoo 54, Mich., announce a new addition to their line of polishing and buffing lathes—Model Vrol, a 3-hp. variable speed polishing and buffing lathe with a speed range of 1500 to 3000 r.p.m. A spindle overhang of 8 in. permits handling of bulky parts without base interference. Spindle speeds are instantly changeable while the lathe is running by turning a dial. A single wide type V-belt is used for the drive from the motor to the spindle. Belt tension is automatically controlled by the motor pulley.



A WIDE ASSORTMENT OF USES HAS been found for this modernistic Plexiglas table designed and assembled by Kim Hoffmann and Stephen Heidrich of New York City. While produced originally as a table for portable typewriters, it can also be used for displaying hosiery, cosmetics, jewelry, etc.; as a bathroom table for make-up accessories; as a cocktail table.

Six pieces of acrylic comprise the table. These are glued together and fastened with six screws which are sunk into the sheets.



EXOTIC FIGURES, SKILLFULLY SCULPtured from plaster of Paris that has been hardened with a plastic resin, make very beautiful decorative pieces.

The resin used in curing the plaster is called Plaspreg—a product of Furane Plastics & Chemicals Co., Los Angeles, Calif. It is this resin that gives the figure a wood-like color and shading, and imparts great strength and durability.

The illustrated piece was designed by Lugi and molded by Moldrite Co. of Los Angeles, Calif.

Kodak

The KODAK TRANSFAX PROCESS . . .

What it is . . .

Transfax is a new, simple reproduction process that puts designs, lettering . . . almost any marking . . . on plastics, metals, and other nonporous surfaces. It can make markings in white on color backgrounds, or in color on a white background. It is rapid, inexpensive . . . needs no darkroom . . . requires no special handling skill.

How it works . . .



You spray light-sensitive Transfax material on your plastic surface (some plastic surfaces, though not many, call for Kodak Transfax Primer).

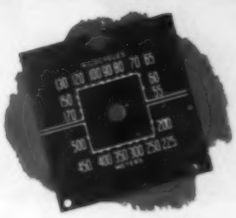


You place the transparent or translucent original on the sensitized plastic surface. Expose to a strong light.



You wash the surface with dilute Kodak Transfax Clearing Solution. Overcoat with Kodak Transfax Primer for durability. The complete processing is done in minutes!

How it may be useful to you . . .



. . . to make dials



. . . to make terminal strips



. . . to make instrument panels

These are only a few of the possible applications of the new Kodak Transfax Process. For more information about its potential usefulness to you, mail the coupon for free folder or write giving complete details about your particular needs.

EASTMAN KODAK COMPANY
Industrial Photographic Division • Rochester 4, New York

KODAK TRANSFAX PROCESS
. . . a revolutionary new reproduction method

New folder — just mail the coupon

Eastman Kodak Company
Rochester 4, N. Y.
Please send me your new folder on the Kodak Transfax Process.

Name_____

Company_____ Department_____

Street_____

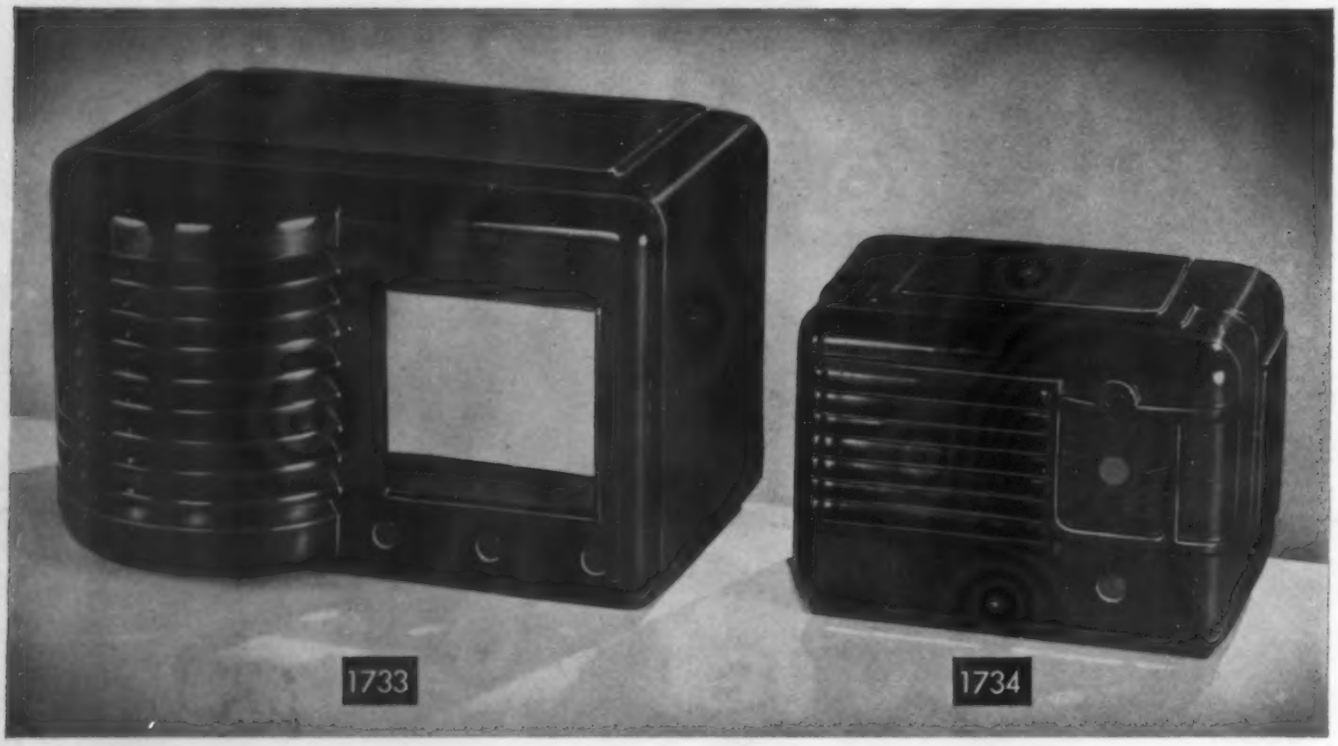
City_____ State_____

Plastics Stock Molds*

SHEET ONE HUNDRED FORTY-SEVEN

These two decorative table model cabinets will be invaluable to the manufacturer who wishes to avoid mold cost when considering housings for his radios. Each is molded in one piece with provision for dial and knobs. The phenolic material accounts for good insulating qualities and lightness in weight. The cabinets are available in black and brown.

* Reg. U. S. Patent Office



1733. Large-size cabinet for table model radio. Dimensions are: $10^1/_2$ in. long, $6^3/_4$ in. high, 6 in. from front to back. Has three openings for knobs and dial. Opening for dial face is $3^1/_2$ in. long by $3^1/_4$ in. high. Concave grill is 5 in. across.

1734. Midget-size cabinet for table model radio. Dimensions are: 6 in. long, 5 in. high, $4^1/_2$ in. from front to back. Has two openings, one for dial and one for knob. Kilocycle designations, 55 to 170, are molded on face. Grill is 4 in. across.

• *The names and addresses of the manufacturers who make these stock molds are listed on page 200.*

• *Molders are invited to submit samples of stock products to appear on these pages as space permits.*

WHEREVER PLASTICS ARE PREHEATED...



AIRTRONICS*

means

Engineering Leadership!

From AIRTRONICS' laboratories has come a steady stream of advancements in preheater design inspired by *and fulfilling* the practical requirements and preferences of the molding industry. Dual Load Selection, Automatic Power Regulation, Automatic Load Accommodation, Automatic Excitation Regulation, powerful Vacuum Cooling—all these features plus extreme compactness and mobility, simplicity of adjustment and operation, versatility of application and *reliability* of service make AIRTRONICS Dual Preheaters the choice of discriminating molders from coast to coast. Contact the nearest AIRTRONICS representative for complete details.

2.5 KW
Model DH

Airtronics MANUFACTURING CO.

*REG. U. S. PAT OFF.

National Sales and Service:

New York, 24-20 Bridge Plaza South, Long Island City
Chicago, 3810 North Broadway
Los Angeles 26, 5536 Cutter Street

News of the Industry

Plastic Compounds, Inc., Hillcrest Ave. and Eagle Rd., Oakmont, Delaware County, Pa., has been formed and will specialize in phenolic molding compounds in colors as well as black and brown. Howard E. McCorkle, formerly of Durite Plastics, Inc., will be in charge of sales and Peter L. Marco, formerly with Monsanto Chemical Co., will now be in charge of the production.

Dow Chemical Co.'s purchase of the styrene plant at Velasco, Texas, from the War Assets Administration has been approved by the Dept. of Justice. In addition to the styrene plant, Dow also acquired a portion of the Velasco magnesium plant, including the lime, chlorine and power facilities. The company's bid on the property was $35,155,000.

These facilities, added to Dow's styrene plant at Midland, Mich., are said to give the company a styrene capacity in excess of 200 million pounds annually. No immediate increase in the volume of polystyrene, however, was predicted.

The McGraw-Hill Digest, in its February issue, lists new structural materials—especially reinforced and laminated plastic materials—as one of the "big ten" industrial and technical developments of 1946. The other nine developments cited are atomic power, radioactive isotopes, gas turbine, liquid fuel from gas, synchrotron, electronic computer, flying wing, helicopter and television.

Wilmington Chemical Corp., 10 E. 40th St., New York City, announces Poly-Tint Plastic Stains for the coloring of various plastics by dipping methods. Two types are now available. The 600 series is designed for coloring cellulose acetate, cellulose acetate butyrate, ethyl cellulose, polyvinyl chloride and other materials in the same class. The 700 series is designed for coloring methyl methacrylate and polystyrene. Each is produced in four standard colors—red, blue, yellow and black, from which any other color may be produced by blending. The average dipping time is from 30 to 50 seconds.

The company also announces Poly-Tint Aqueous Dispersions for the coloring of latices and aqueous dispersions of natural and synthetic rubber, polyvinyl chloride, polyvinylidene chloride and similar materials. They are available in red, blue, yellow and black.

Other recent developments are two cold mold compounds—Wilcorite CM-1300, a black material and Wilcorite CM-1301, a grey product. These compounds are in free flowing powder form, suitable for use in a hopper feed. After molding, no after-baking operation is necessary and the finished molded article is ready for use after an aging period at room temperature of 24 to 48 hours. No dwell in press time is necessary. The minimum recommended pressure for molding is 10,000 p.s.i. The compounds are inert to most solvents, lubricating oils and greases. The finished product may be machined, wire brushed, buffed, sanded or polished.

The Plast-Lord Co. has moved from 1186 Broadway, New York City, to 129 Montague St., Brooklyn 2, N. Y. Joseph Wagner is no longer a member of the company, leaving Samuel L. Strickman and Harold Holtzberg as sole owners.

Roberts Supply Co., 300 Northeast 72nd St., Miami, Fla., has organized a Plastic Sales Div. for the sale of all types of plastic products.

Esquire magazine has produced a color motion picture, "Where do we go from here," portraying the economic problems ahead and ways and means of meeting them. It is designed to give advertising, marketing and selling executives a picture of the post-war future America faces.

MODERN PLASTICS is the only magazine contributing information for the production of this picture. Other contributors, mostly large industrial companies, include General Motors Corp., General Electric Co., Lockheed Aircraft Corp., United States Steel Corp., B. F. Goodrich Rubber Co., United States Marine Corps and Coast Guard.

The film runs 36 minutes and is the result of two years of study and research by Esquire's Market Research Department. It is now available for general showing to advertising agencies, advertisers and all business and industrial groups concerned with the postwar marketing as well as selling problems.

The Plastics Institute T.N.O., Julianalaan 134, Delft, Holland, has been organized under the management of Ir L. C. Stoutjesdijk. Dr. A. J. Staverman heads the scientific department, H. A. Frank, the industrial information department and Dr. W. J. Taat, the institute's industrial research department.

World Plastex, Inc., for custom extrusion of thermoplastics, has been opened by Milton Book, Edward B. Leimseider, Irving Senders and Solomon Senders at 1736 Jerome Ave., Bronx 53, N. Y.

The United States Rubber Co., 1230 Sixth Ave., New York City, has developed flocking adhesive M-6177, a new synthetic rubber adhesive, for use in conjunction with textile fibers to make plush, velour, suede and velvet surfaces. It may be sprayed or brushed on wood, metal, glass, plastic and other surfaces and is said to have longer life and more flexibility than many base coat enamel adhesives now being used.

Claremont Waste Mfg. Co., Main & Elm streets, Claremont, N. H., is using its rayon flock finish, called Claremont Rayon Flock, which is said to provide the same appearance and feel as velvet when applied to a metal base, as the finish for a display where it is credited with furnishing excellent insulation for the product on display from the heat of the incandescent light inclosed in the base. The flock is sprayed on the freshly painted bases with conventional painting equipment to produce a smooth and well-bonded finish.

Monsanto Chemical Co., St. Louis 4, Mo., has announced the formation of a Texas Div. of the company with headquarters at Texas City, naming Joseph R. Mares, general manager of the new manufacturing unit. The 50,000-ton capacity styrene plant at Texas City, which was purchased in August, will form a nucleus for the new manufacturing division.

The Plastics Div. of the company has revealed that construction of a new plant for production of woodflour, a key ingredient of phenolic type plastics sold under the trade name Resinox, at Springfield, Mass., is expected to be completed by May.

Celanese Corp. of America, 180 Madison Ave., New York City, has established a fellowship in chemical engineering at the University of Michigan, Ann Arbor, Mich. The fellowship is for a term of five years from the time of the appointment of the first recipient, and the subjects to be investigated under the fellowship will relate to the field of plastics and high polymers.

Glyco Products Co., Inc., 26 Court St., Brooklyn 2, N. Y., has leased the Marshall Chemical Warfare Service plant at Natrium, W. Va., used during the war for production of chlorinated aliphatic solvents and hexachlorethane, from the government. The plant, covering an area of over 84 acres, is composed of 14 buildings. Manufacturing operations are expected to start about the first of March,

DELIVERY— According to Schedule!



MACOID'S extensive manufacturing facilities are an important asset to MACOID customers in production scheduling. On a plastic handle for the Hoover Cleaner, for example, MACOID has been able to keep steady pace with the intensified post-war demand for this popular home appliance.

MACOID facilities for solving design problems, too, are likewise illustrated by this job. Specifications called for a cylindrical shape formed on a radius with uniform wall thickness throughout. To complete this job economically and in volume, MACOID engineers devised some of their own equipment. The result (shown above, ½ actual size) is a light-weight, comfortably-shaped handle that exactly meets the requirements.

Whether your plastic problem be one of material, design, assembly, or production, MACOID engineers and facilities are equipped to be of service.

DETROIT MACOID CORPORATION

Originators of Dry Process Plastics Extrusion

12340 CLOVERDALE • DETROIT 4, MICHIGAN

EXTRUSION AND INJECTION MOLDING

the initial products being monochlorbenzene, ortho- and para-dichlorbenzenes, polyhydric alcohol esters and special organic chemicals.

Alexander Girard, designer, has opened a new office at 379 Fisher Rd., Grosse Pointe 30, Mich.

The Plasticarve Corp., 25 N. Michigan Ave., Pasadena 4, Calif., announces the development by Owner P. B. Crouse of Plasticarve, a thermoplastic particularly desirable for the making of patterns and experimental models. By dipping in hot water it can be hand-formed or carved like putty to form articles of all types. Analogous to low temperature alloys such as Cerrobend, it melts at a temperature of 150° F. and has a flash point of 800° F.

Flexmir, Inc., 20–28 Broome St., Newark 3, N. J., metallic platers on plastics, announces the consolidation of all the property, equipment and assets of **Plastics Finishing Co., Inc.; Flexmir Sales Co., Inc.; Flexmir Display Co., Inc.; 20 Broome Realty Co., Inc.** The merged company will continue to operate under present name of Flexmir, Inc. Officers are: Max Blank, president; Ira Wosnitzer, Frank Legay and Rocco Ambrosini, vice-presidents; Harry Tepper, treasurer; Jules Tepper, secretary. Mr. Legay will be in charge of all sales, Mr. Ambrosini in charge of Plastics Finishing Division. **Metallic Plastics Co.,** metallic finishers on glass, ceramics, etc., will remain as a Flexmir subsidiary.

Acme Backing Corp., Meadow & Bogart streets, Brooklyn 6, N. Y., has incorporated into its expanded Technical Dept. all activities and personnel of **Affiliated Research, Inc.,** formerly located at 239 E. 44th St., New York City.

Scheer Chemical Co., Inc., 60 E. 42nd St., New York City, has been organized by Walter E. Scheer, former vice-president of Amecco Chemicals, Inc. The new company will act as manufacturers' agents and technical sales and market development consultants for chemical manufacturers in fields of plastics and plasticizers, surface active agents, fine chemicals.

Coronet Textiles Limited, University Tower, Montreal, has been appointed the Canadian distributor of Plexon yarns.

Paisley Products, Inc., 1770 Canalport Ave., Chicago 16, Ill., has purchased the Lignotite Co., formerly at 882 Milwaukee Ave., Chicago 22. The purchase includes all formulae, manufacturing processes, technical and customer records and supplies. All manufacturing of the Lignotite product line will be done at Paisley's recently improved Chicago plant.

The Delgene Manufacturing Co. of Defiance, Ohio, will begin production of small plastic parts in February. Members of the firm are Gene and Paul Williams of Defiance and Delbert Haines of Crawfordsville, Ind.

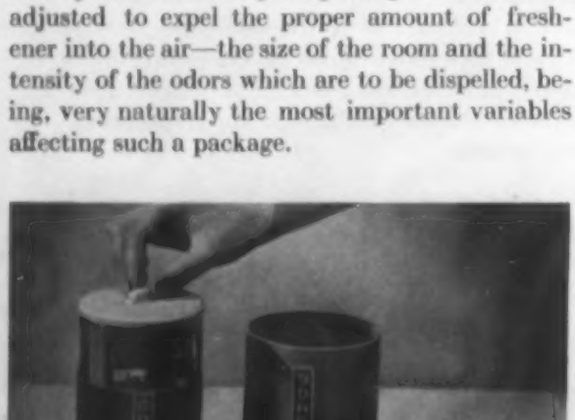
Dual Fabricators Corp., 893 E. 134 St., New York City, has been formed by Erwin Reveri, production manager of Steiner Mfg. Co. for the past 13 years. Mr. Reveri purchased the business and plant of Dual Creators and will concentrate on precision fabrication of acrylics.

Aridye Corp., Fair Lawn, N. J., heretofore a wholly owned subsidiary, has become a division of its parent company, **Interchemical Corp.** and is now known as the **Textile Colors Division.**

Onnie Mankki, A.I.A., has opened an office for the practice of industrial design and architecture at 7113 Euclid Ave., Cleveland 3, Ohio.

The Egmont Arens Industrial Firm, 480 Lexington Ave., New York City, announces the development by Robert Brinkema, a firm member, of a new process for making inexpensive prototypes of proposed low-pressure or high-pressure molded objects. The process lends itself to moldings of Co-Ro-Lite, laminations of cotton or glass cloth, and sandwich constructions

PLASTICS PLAY AN IMPORTANT PART in the Odac (air freshener) package which presented the manufacturer, O-Cedar Corp., with many problems during its development. The basic problem was to get a package that could be adjusted to expel the proper amount of freshener into the air—the size of the room and the intensity of the odors which are to be dispelled, being, very naturally the most important variables affecting such a package.



In the solution of this problem, a plastic dispenser was developed. It consists of two tight-fitting telescoping sections. The walls of each section are made of blue Vinylite sheet 0.020 in. thick. The sheets are formed over a cylindrical-shaped mandrel and the seams are heat sealed. The cover for the top section of the dispenser and the base for the bottom section are both injection molded of ivory vinyl and provided with grooves into which the blue cylinders fit.

The problem of adjusting the amount of freshener to be expelled was solved by die cutting slots in the top section of the dispenser. Thus, by sliding this part up or down, the size of the slots are adjusted to permit the proper evaporation of the freshener liquid.

Cruver Manufacturing Co., Chicago, Ill., who fabricate and mold the Odac dispenser, must be credited with helping to develop this part and with precision of workmanship in making it. The complete Odac package consists of a glass jar for holding the liquid, a felt wick and jar cover to absorb the liquid gradually, corrugated pieces for protecting the glass jar in shipment, the plastic dispenser and an outer cardboard cover.



● If your products require precision molded plastics with colorful eye-appeal and the satin-smoothness that makes consumers want them, look to the keen "x-ray eyes" of General Industries' engineers for complete satisfaction.

Not just "blueprint readers", these men are expert design interpreters who see through inanimate lines and specifications to your selling problem. Their experience and imagination give you the finest molded plastics, quicker and at lowest possible cost. Consult us, without obligation, of course.

CHICAGO: Phone Central 8421
MARION, IND.: Phone 2566W
CAMDEN: Phone 2215
DETROIT: Phone Madison 2246
BUFFALO: Phone Grant 8557

THE GENERAL INDUSTRIES CO.

Department PM • Elyria, Ohio

with cloth outer skins and fiber fillers. The prototype can be fashioned into a working model which will have the strength, weight and appearance characteristics of the proposed finished job. It also makes possible the elimination of problems in the design before production molds are ordered.

Plastic Engineering, Inc., 8506 Lake Ave., Cleveland, Ohio, has purchased **Sherman & Co.,** 608 St. Clair Ave. N.W. in Cleveland. The extrusion equipment of Sherman & Co. will be installed in the Plastic Engineering plant this month. O. B. Sherman will become manager of the extrusion division of Plastic Engineering.

Personnel changes

Peers de Nieuwburgh, director of Belplastics, 151 Rue Neuve, Brussels, Belgium, arrived in the United States toward the end of February for a stay of several weeks. He is interested in plastics of all types, machinery used in the plastics trade and may be reached through American International Trade Co., 1050 Avenue of the Americas, New York City.

Andrew F. Haiduck has been appointed general manager of the Duramold Div., the Fairchild Engine and Airplane Corp., at Jamestown, N. Y., which specializes in molded low-density materials of sandwich construction.

A. M. Freeman has been appointed director of technical service, of the Casein Co. of America, Div. of the Borden Co., 350 Madison Ave., New York City.

Dr. C. F. Winans has been appointed chemical director of the Pennsylvania Coal Products Co., Petrolia, Pa., a subsidiary of Koppers Co., Inc.

Dr. Robert J. Moore, technical co-ordinator of Bakelite Corp., 300 Madison Ave., New York City, unit of Union Carbide and Carbon Corp., died Jan. 6 at his Montclair home following a heart attack.

W. D. Maginnes has been named as sales manager of the nylon monofilament section, Plastics Dept., E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. He succeeds **W. W. Perry** who is retiring on March 31.

In the chemical division laboratory of the Plastics Dept., **Dr. Chester K. Rosenbaum** has been appointed research manager in charge of the semiworks process development and product development sections. **Edward B. Cooper** will become research manager of the physics and analytical sections.

Charles E. Mears has been appointed manager of the new nylon yarn plant under construction near Chattanooga, Tenn. **Dr. W. W. Heckert** and **Dr. E. W. Spanagel** have been made director and assistant director respectively of the cellophane research at Buffalo. **Dr. G. P. Hoff** has been appointed director of acetate research and **Dr. G. M. Karns,** director of cellophane research in Wilmington. **Dr. W. L. Hyden** has been promoted to position of director of auxiliary sections, consisting of personnel, planning, development and patent service.



GEORGE P. LEHMANN



JOHN L. MCMURPHY

The Chemical Dept. of General Electric Co., Pittsfield, Mass., has established a **Plastics Div.** and **Compound Div.** in place of the former **Plastics Divisions.** George P. Lehmann has been named manager of the Plastics Div. and John L. McMurphy manager of the Compound Division.

Mr. Lehmann's appointment makes him responsible for operations involving the molding and laminating of plastics materials at Coshocton, Ohio; Ft. Wayne, Ind.; Meriden, Conn.; Pittsfield, Mass.; Scranton, Pa. and Taunton, Mass. Mr. McMurphy will be responsible for the operation of phenol and compound facilities at Pittsfield. **Harold M. Patterson,** manager of the Taunton Works of the Plastics Div. has been named engineering manager of the Division.

An Affiliated Manufacturing Companies Dept. has also been established with L. R. Boulware, vice president, as general manager. E. J. Harrington has been named manufacturing manager and Roy W. Johnson marketing manager.

Spencer Palmer has recently been elected an assistant vice-president of Tennessee Eastman Corp. at Kingsport, Tenn. He will carry on his new duties in addition to those of his old post as sales manager of the Cellulose Plastics Division. **H. G. Stone,** works manager, has been named vice-president. Other changes include the promotion of **R. L. Churchill, Henry L. Ford** and **B. M. Brown** to assistant vice-presidents and **R. L. White** to treasurer.

N. J. Rakas has become general manager and vice-president of Fisher Plastics Corp., Newton 58, Mass. The company is engaged in injection molding, transfer, extrusion, compression and the coating of the various textiles with many different types of resins.

H. E. Beane has been appointed general sales manager of the Bristol Co., Waterbury, Conn.

Emery N. Cleaves has been appointed assistant to **Harold Blancke,** president of Celanese Corp. of America, 180 Madison Ave., New York City.

Charles F. Landsheft has been appointed assistant sales manager of the Boonton Molding Co., 122 E. 42nd St., New York City.

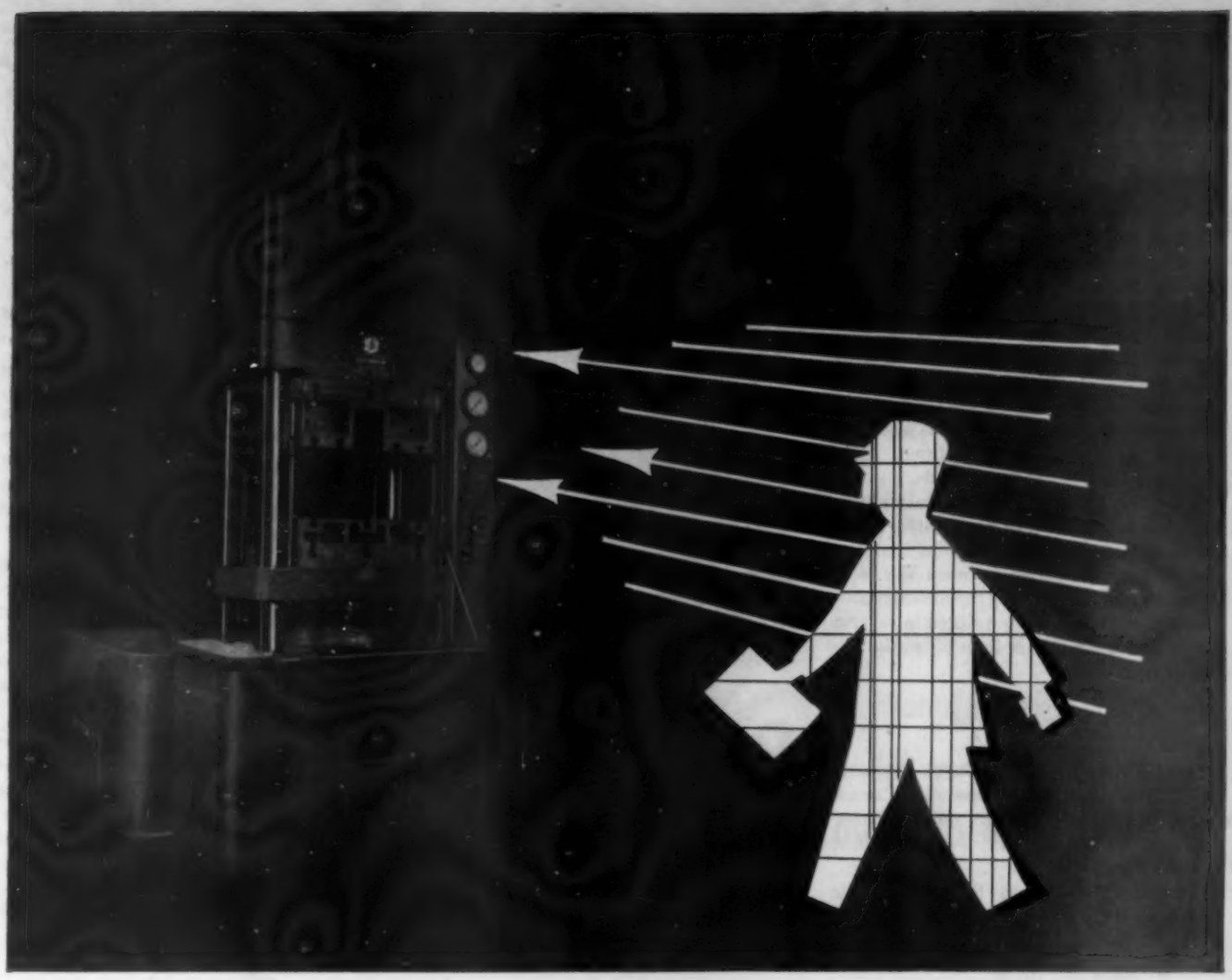
Dr. Glenn S. Watson has been appointed chief chemist of the Calco Chemical Div., American Cyanamid Co., located in Bound Brook, N. J.

Dr. Gabriel Bosschieter and **Clarence D. Kirkeby** have become associated with the Coatings Div. of R. M. Hollinghead Corp., Camden, N. J. The division specializes in production of new Cocoon coatings.

Dr. M. L. Crossley, director of research, Calco Chemical Div., American Cyanamid Co., Bound Brook, N. J., has been unanimously selected to receive the 1947 gold medal of the American Institute of Chemists. This is in recognition of Dr. Crossley's scientific work leading to discoveries in the fields of dyes and pharmaceuticals, and his activities in behalf of the profession of chemists.

Dan J. Forrestal, Jr., former assistant to the president of Parks Aircraft Sales & Service, Inc., has become assistant to the director of industrial and public relations, Monsanto Chemical Co., St. Louis 4, Mo.

Dr. A. H. Tenney, recently completing three and a half years with the Manhattan Project at Oak Ridge, Tenn., has returned to the New York offices of Carbide and Carbon Chemicals Corp., 30 E. 42nd St.,



Get into the **BLACK**

with a *BALDWIN PLASTICS PRESS*

When you consider your next press, remember this: Southwark hydraulic presses are designed not only to make good *products* for you . . . but to make good *profits* for you.

Almost any press can show a return while demand is high . . . but when competition is keen, it's the extra margin of performance *from a press exactly suited to the job* that keeps you in the black.

You'll find, at Baldwin, a *Standard line of modern presses* with features and advantages that you would ordinarily expect only in *custom-built* equipment. You'll find a range of sizes that takes care of a wide variety of production needs. You'll find representatives that understand your problems, and that can work with you in applying the proper press to the proper job. You'll find the engineering talent and experience of one of the country's oldest and largest press manufacturers always on call.

We'll be glad to talk over the profit possibilities of Baldwin presses with you at your convenience.

BLW THE BALDWIN GROUP **BALDWIN**

HYDRAULIC PRESSES

Write or telephone The Baldwin Locomotive Works, Philadelphia 42, Pa., U.S.A.
Offices: Philadelphia, Chicago, St. Louis, Washington, New York, Boston, San Francisco, Birmingham, Houston, Cleveland, Detroit, Pittsburgh, Norfolk, Seattle.

New York City, as a technical representative for the Fine Chemicals Division. He will specialize in the development of markets for new chemicals being developed by the research laboratories.

Sorry!

In our writeup in the January issue, page 172, on the Moldmaster, a new type low-cost injection molding machine put out by Crown Machine & Tool Co., 2800 W. Lancaster Blvd., Fort Worth 7, Texas, we failed to make it clear that production models of the Moldmaster are already in the process of manufacture. A similar machine, to be known as the Castmaster, for the die casting of non-ferrous metals is in the process of being produced. The Moldmaster weighs 5500 pounds.

In our description of the Shellmar Products Co. labels appearing in the Plastics Products section, page 122, we said that the labels were laminated between sheets of Lumarith film. Actually the material consists of cellulose acetate printed in reverse and laminated in the same operation to the paper.

Meetings

The Chicago Section of S.P.E. installed E. E. Woodman, Durez Plastics & Chemicals, Inc., as president on Jan. 9. Other officers also installed are: Ray M. Alden, Globe Imperial Corp., vice-president; Clarence McCormick, Superior Plastic Co., secretary-treasurer; Elmer Maywald, program chairman; Charles Dassing, Bakelite Corp., credentials; Maurice Meltzer, Service Plastics, Inc., nominating committee; L. H. Amrine of Imperial Molded Products Corp., T. E. Richards of Midwest Molding & Mfg. Co. and John Bachner of Chicago Molded Products Corp., auditing committee; Frank C. Rowley, Durez Plastics & Chemicals, Inc.; election committee chairman; Art Lovegren, Industrial Molded Products Co., house committee; James M. Connors, MODERN PLASTICS, publicity; Clarence McCormick, Superior Plastic Co., publications; L. H. Amrine of Imperial Molded Products Corp. and William L. Hess of Ancsite Co., delegates to Chicago Technical Societies Council; E. E. Woodman, Durez Plastics & Chemicals, Inc., and Wynne Cooper, Bakelite Corp., alternates.

City College of New York, in cooperation with the **New York Public Library,** is offering a night course for the spring semester in plastics designing. Leonard Pytlak is teaching classes each Monday at Yorkville Library, 222 E. 79th St.

The Society of the Plastics Industry and **New York University** are sponsoring a repeat course on plastics at the University's school of retailing for the spring semester. Unlike the fall course, the new class is open to all types of plastics students as well as retailers. J. Earl Simonds, independent plastics consultant and lecturer for the course, began classes on Feb. 10. The course will continue through May 12.

Members of the Education Committee of S.P.I. who are again serving as advisers are: **Horton Spitzer,** Plaskon Corp.; **Charles A. Breskin,** editor and publisher, MODERN PLASTICS; **Dr. R. V. V. Nicholls,** department of chemistry, McGill University; **Frank H. Shaw** president, Shaw Insulator Co.; **Clayton S. Shoemaker,** Eastern sales manager, Dow Chemical Co.; **E. A. Stillman,** Watson Stillman Co.

The Newark and New York Sections of S.P.E. held a joint meeting Feb. 12 at the Newark Athletic Club. J. S. Hurley, Jr., Chemical Dept. of General Electric Co., discussed new silicone developments. William L. Searles, Tennessee Eastman Corp., gave a short talk on cellulose acetate butyrate prior to showing of the company's new color film entitled, "The story of Tenite."

The Graduate School of Polytechnic Institute of Brooklyn is offering a practical course in management of chemical plants for spring semester. It is open to graduate students in chemical engineering and well-qualified men from industry with equivalent college training.

The Rhode Island and Southeastern Massachusetts Section of S.P.E. met at Providence Biltmore Hotel in Providence, Feb. 11. W. A. Toepel of Parker-Kalon Corp. discussed fastening devices while Frank Donahue of Monsanto Chemical Co. spoke on thermosetting materials.

(Please turn to page 200)

Pacific Coast Section of S.P.I. Program

A tentative program for the fourth annual spring conference of the Pacific Coast Section of S.P.I. at Hotel Biltmore, Santa Barbara, Calif., March 20 through March 22, has been announced. Robert B. Gutsch is general chairman.

The session on "The 1947 approach to production and merchandising," with George Scribner of Boonton Molding Co. as chairman, will cover selection of plastic materials, proper production approach, importance of plastic packagings, consumer education through advertising, department store needs and large chain store distribution of plastic items.

John Delmonte of Plastic Industries Technical Institute will conduct the session on "Latest technical developments." Topics include application of vinyls to textiles, plastics in the field of adhesives, new in molding developments materials and new developments in laminates. For the session on "In the future with plastic materials," J. R. Hoover, B. F. Goodrich Chemical Co. and president of P.M.M.A., will discuss P.M.M.A. and its industry purpose. Frank Carman, general manager of P.M.M.A. will talk on the 1947 materials picture. Plastics, fact or fiction, will be discussed by J. R. Price of Bakelite Corp. while the 1947 business prospective will be discussed by W. Stuart Landes, Celanese Plastics Corp.

The session on "S.P.I. and the plastics industry" will include the following speakers: Neil O. Broderson, president of S.P.I.; Mr. Scribner; William Cruse, executive vice-president of S.P.I. and Frank Wilcox, past chairman of the Pacific Coast Section of S.P.I.

FOR PROFITABLE ASSEMBLY

Let TINNERMAN *analyze your fastening problems*

BEFORE You Leave the "Mock-up" Stage



Just as the Galvin Manufacturing Corp. did with their new Motorola Auto Heater

★

These 14 Fasteners did the Trick



Our new Bulletin No. 214 goes into detail on this Motorola job and is available for the asking. Since you may be able to use to advantage many of the fastening ideas illustrated, write for a copy today.

To take full advantage of the SPEED NUT System of Fastening, Galvin engineers brought the "mock-up" and prints of their new Motorola Heater to Tinnerman for a fastening analysis *before* building tools and dies. They sat right in with Tinnerman development engineers who went over the heater part by part—explored every possible production short cut—planned its assembly from start to finish.

The final design of the heater was modified to take advantage of *standard* SPEED NUTS wherever possible. Where standards could not be used, new SPEED NUTS were created for a more efficient assembly. The result was *assembly perfection.* Many parts were attached with SPEED CLIPS and merely snapped into position under spring-tension. Others were fastened by simply pressing SPEED NUTS over unthreaded studs. And where it was necessary to use screws, SPEED NUTS made the attachments simple and fast.

This engineering service is available to you, too—at no cost. For the utmost in assembly savings, contact our Sales Engineering Department *before* you leave the "mock-up" stage. But in any event, check the SPEED NUT System of Fastening before you go into production.

TINNERMAN PRODUCTS, INC. 2048 Fulton Road
Cleveland 13, Ohio

★ **In Canada:** Wallace Barnes Co., Ltd., Hamilton, Ontario
In France: Aerocessoires Simmonds, S.A., Paris
In England: Simmonds Aerocessories, Ltd., London
In Australia: Simmonds Aerocessories, Pty. Ltd., Melbourne

Speed Nuts*

*Trade Mark Reg. U. S. Pat. Off.

PATENTED

FASTEST THING IN FASTENINGS ***MORE THAN 4000 SHAPES AND SIZES***

IRRITATING AND BETRAYING QUESTIONS by novice poker players are things of the past with a unique new plastic poker chip. The chips, made in red, white and blue, show the poker hands numbered clockwise in order of their value.



Each one consists of two pieces of clear polystyrene—a cup and plug—which are bonded together with the printed matter sandwiched between them. Parts are injection molded in a 20-cavity die by Champion Molded Products, Inc., of Toledo, Ohio, which also molds the polystyrene chip case. The case, made in two grooved halves, is closed by metal channels which slide over ends.

Chips are assembled by Plastel's Graphic Poker Chip, Toledo, Ohio, which places the die-cut paper disks in the cup section, locks them in by inserting the plug, and anneals the assembly.

These chips, designed by E. W. Fuerst, show five poker hands on each side. It is also possible to produce chips with nine hands on one side and advertising matter on the reverse side. The sealed-in printed matter is protected against defacement and chips, having lifetime wearing qualities, are easily wiped clean.

Flameproofing cotton fillers

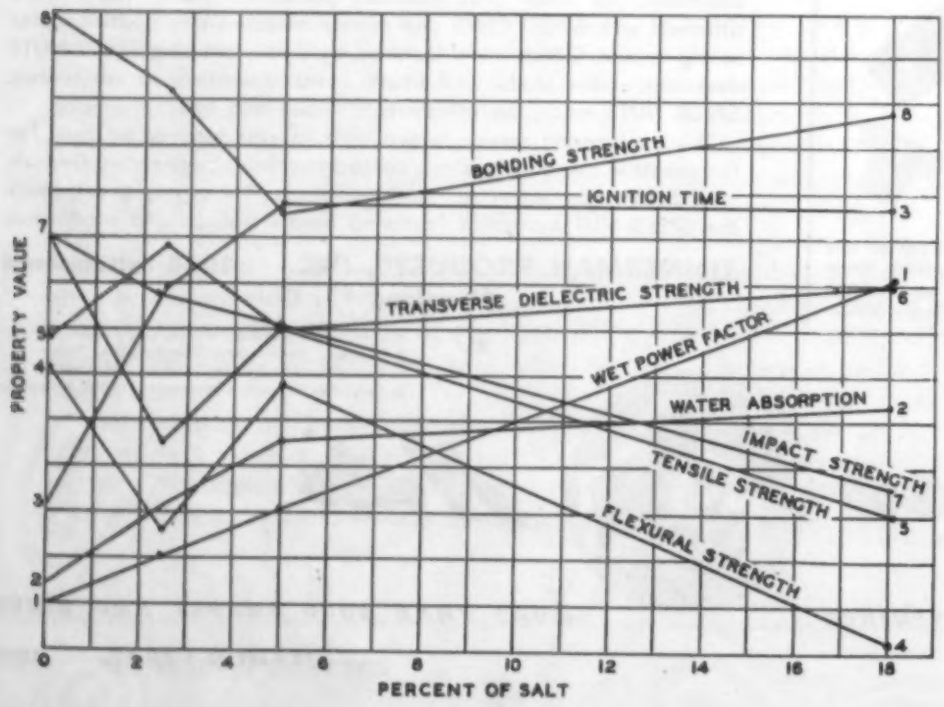
(*Continued from page 153*) where inorganic fillers and nitrogen-liberating resin combinations are available with other satisfactory properties.

5. For applications requiring maximum performance and where cost is of secondary importance, it is recommended that inorganic fillers such as glass fiber and asbestos be used. It is recognized in making this recommendation that the salts studied were not necessarily those best adapted to the purposes in mind and that further research might develop materials which would do a satisfactory job of flame- and glowproofing cellulose fillers without causing any degradation at all in the mechanical and in the electrical properties.

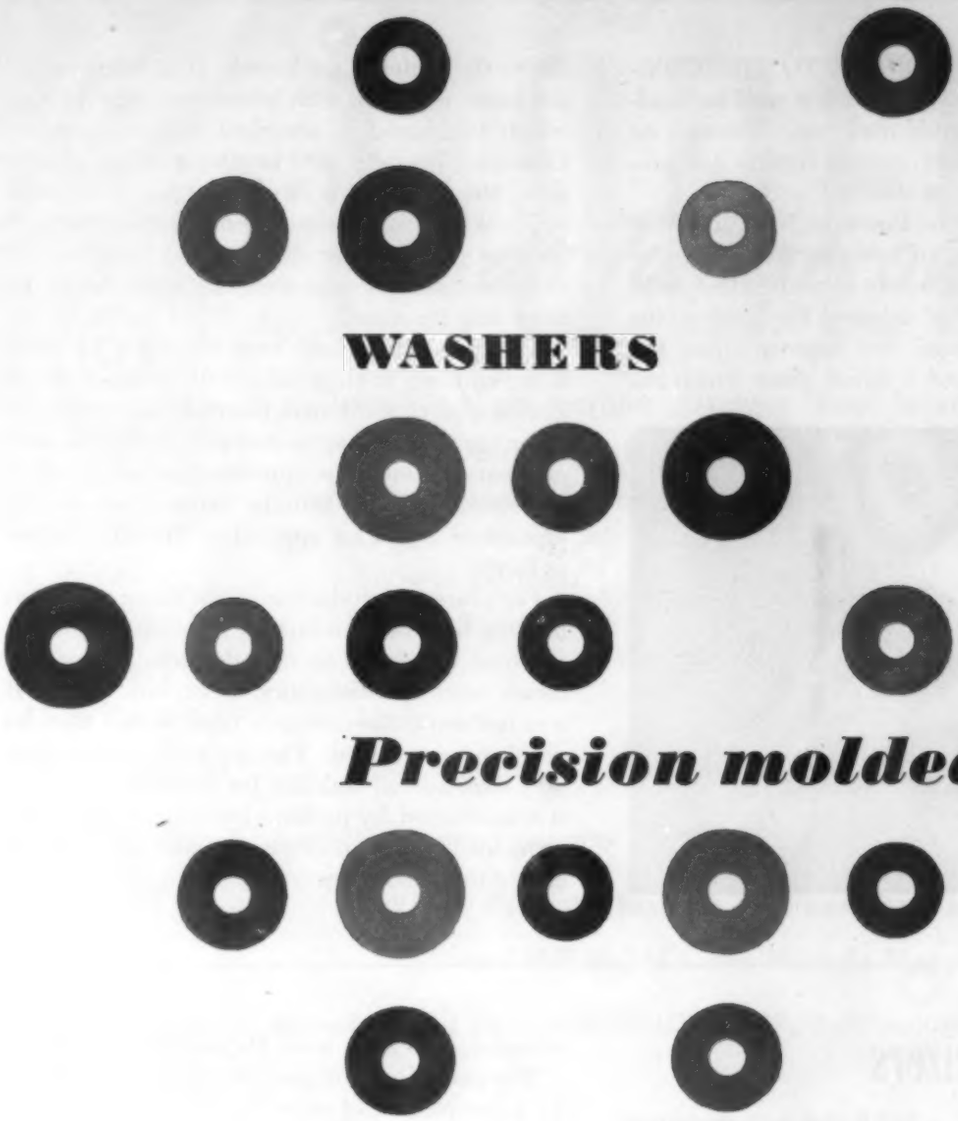
6. For applications wherein cost is a factor and performance specifications are not as rigid as those pertaining to shipboard use, the use of such a resin as BV1112 and a salt combination of borax and boric acid, using either a fabric or a web base, gave promising results (Table I, Combinations Nos. 4 and 8).

Acknowledgments

The authors would like to acknowledge with sincere appreciation the assistance and suggestions of E. F. Seaman and R. W. Stewart of the Bureau of Ships, R. R. Winans of the Materials Laboratory at the Brooklyn Navy Yard, E. V. Painter and John Lyman of the National Cotton Council.



2—A graph showing the trends evidenced by the various laminate properties as the salt concentration varied for one particular combination (No. 4)



WASHERS

Precision molded

Tough, yet resilient, these NYLON washers are another example of skill in molding Nylon to close tolerances.
When the Hall Products Co., of Clifton, New Jersey, designed these quality washers, Hall placed their production problems in the hands of Atlantic of New York.
Atlantic's success in molding difficult industrial products, offers significant answers to manufacturers with similar problems.
Our engineers are available for consultation.

ATLANTIC
OF NEW YORK

ATLANTIC PLASTICS, INC.

132-25 FORTIETH ROAD, FLUSHING, N. Y. • *"Here dwells ingenuity"*

AS A COMPANION PIECE TO THE COMpact and lipstick, the Glamastick is used for holding and dispensing liquid make-up. Through its unique use of capillary action, liquids are prevented from dripping or leaking.

Boonton Molding Co., Boonton, N. J., injection molds the Glamastick of nylon for W. F. Bryant Co. Its four pieces, made in a combination mold in one shot, consist of a barrel for holding the liquid-absorbing sponge, two caps to cover the ends of the barrel and a fluted piece which encircles the center of the barrel. The filling end of the barrel is slotted with lateral openings through which the liquid is absorbed into the sponge. Colors are liberally used to glamorize the stick—pink, blue, red, yellow, white or black being used singly or in combination. Various parts of the stick are also gold or silver electroplated to attain an even more striking appearance by highlighting the more delicate colors.



To fill the stick, both caps are removed. The filling-end cap is then filled with liquid and the slotted end of the barrel inserted slowly into it. After the sponge is saturated with fluid, it is only necessary to touch the opposite protruding end of the sponge to the skin to extract the desired amount of liquid for application to either hands or face.

For years the production of the Glamastick was held up because of a lack of a suitable material. Perfume was found to corrode metal, other materials were unsatisfactory in various ways. It was not until the company tried nylon that its problems were solved. This material has the necessary dimensional stability for molding the piece, it is unaffected by perfume ingredients and it can be molded to tolerances which eliminate the necessity of threaded screw caps.

Mesamoll plasticizers

(*Continued from page 156*) −26° C. by replacement of 33 percent of the Palatinol by Mesamoll HB. With kaolin as filler, not only did the cold resistance improve to −30° C., but the rate of wear lessened. The composition of this sole, which is given in Table I as No. 185, corresponds to a saving of 25 percent of the Palatinol F. In an experiment in which half the Palatinol F was replaced by Mesamoll HB, the usefulness of the sole fell off too much.

An advantage of Mesamoll HB over Mesamoll is better bonding power. This is especially noticeable in the region of extreme plasticization as, for example, with a composition containing 35 parts PVC, 65 parts plasticizer. In such a case, Mesamoll gives only an uncompacted mass, while Mesamoll HB yields a compacted crepe of reasonable strength, considering the high plasticizer content.

The idea of producing shoe sole material with a view to economizing on the use of polyvinyl chloride is connected with this observation. You will see in Table I under Nos. 194 and 174, two soles made with a 38 percent polyvinyl chloride content. The favorable effect of replacing the silica powder by kaolin is again brought out, especially in relation to resistance to abrasion. In both soles Palatinol is no longer used.

The part Mesamoll plays in these recipes can be seen by a comparison of soles No. 174 and 184, noting the enormous fall in abrasion resistance when Mesamoll HB is replaced by the old Mesamoll I. Consideration of the cheapness of the brown coal hydrogenation products is a further inducement to use Mesamoll HB.

The soles, after impregnation with Vinnol H 40 (Wacker polyvinyl chloride) solution, can readily be stuck to leather using pyroxylin glue. To what extent adhesion can be effected by the recently announced Oppanol-type single glue remains to be seen. One sole, admittedly not of the latest type but made with Mesamoll HB, has been tested in wear experiments and found surprisingly good in abrasion resistance.

Alkylsulfonic esters

Finally some remarks may be made on a subject which, strictly speaking, does not come under the heading of this report but which should be mentioned because of its close relationship. This is a new type of plasticizer with a high resistance to cold, which we have very recently developed and which consists of alkylsulfonic ester (Mesamoll is an aryl ester).

The sulfonchloride used for this is the Mersol H which we already make on a very large scale, while the



MODERN *as Tomorrow...*

Tougher than leather, stronger than fabrics, MIRALON, the vinyl miracle, is fast becoming the preferred material for thousands of products such as:

Curtains	*Shower Curtains*	*Aprons*	*Handbags*
Hangings	*Watch Bands*	*Bibs*	*Brief Cases*
Upholstery	*Shoes*	*Bowl Covers*	*Wallets*
Floor Covering	*Umbrellas*	*Tablecloths*	*Garment Bags*
Wall Covering	*Book Binding*	*Luggage*	*Raincoats*



Available in any color, any texture, any gauge . . . plain, designed, printed

Where strength, texture, and beauty are required,

use MIRALON —the Miracle Material.

Manufactured by TEPPER-FIELDS CORP., 8-67 Astoria Blvd., L. I. City, N.Y.

DISTRIBUTED BY

CHARLES S. FIELDS, Inc.

792 STERLING PL., BROOKLYN, N. Y. • PResident 4-1560

MIRALON

THE MIRACLE MATERIAL



VINYL SHEETING

SUPPORTED AND UNSUPPORTED FILMS

WE supply a quality vinyl sheeting in translucent, transparent or opaque forms in an extensive range of colors. The material may be embossed or decorated—formed into shapes, cut, stamped or sheared. Our films contain *only* virgin resins.

We also supply *special* adhesives for bonding vinyl to vinyl or bonding vinyl to other plastic materials. Our films and cements are available now.

Wire, write or phone for samples and full information.

SPECIAL FORMULA CHEMICAL CO.

Manufacturing Chemists

400 West 219th Street
New York 34, N. Y.

alkyl component comes from alcohols of the approximate chain-length C_6—C_{18}. The esterification is carried out quite analogously to the Mesamoll production, by treating a mixture of Mersol H and the alcohol with ammonia gas in a half-filled stirred vessel.

The following notes may be made about the alcohol component: the smooth esterification of such alcohols by Mersol is surprising in the light of earlier experience at Leuna, for the use of the lower alcohols (methanol, ethanol) directs reaction towards formation of sulfonamide. As has recently been found, the higher alcohols behave differently; sulfonamide formation occurs only to a small extent and the desired ester is produced as the principal product of reaction.

We used as alcohol components in our experiments the higher alcohols of the isobutanol synthesis, the Synol-alcohols and the Oxo-alcohols. The sulfonic esters prepared from the latter yielded plasticizers with good cold resistance so long as the olefins submitted to the Oxo reaction led to relatively straight-chain alcohols. In other words, Oxo-alcohols from isooctylene or polymer benzine are not suitable, but those from cracked olefin and primary olefin are. It has usually been found expedient for practical purposes to use not the pure esters, but a mixture with Mesamoll.

Such a plasticizer with the Troisdorf standard charge No. 1514 in the ratio 60:40 yields a crepe of the following properties:

Tensile strength, kg./cm.²	125
Extension, %	235
Volatility, %	2
Water absorption, %	11
Cold resistance, ° C	−35

The cold resistance places this ester in the class of the highly cold-resistant plasticizers.

If one considers that from 100 kg. of Oxo-C_9-alcohol there can be produced, on the one hand, 145 kg. of phthalic ester and, on the other hand, over 600 kg. of sulfonic ester (over four times as much) one appreciates the advantage attending the development of the new plasticizer. On the basis of the amount of forerun fatty alcohol present, one can see that one can obtain a much greater amount of plasticizer by esterification with the monobasic Mepasin sulfonic acid than by combination with the dibasic phthalic acid.

Unity

(*Continued from page 5*)

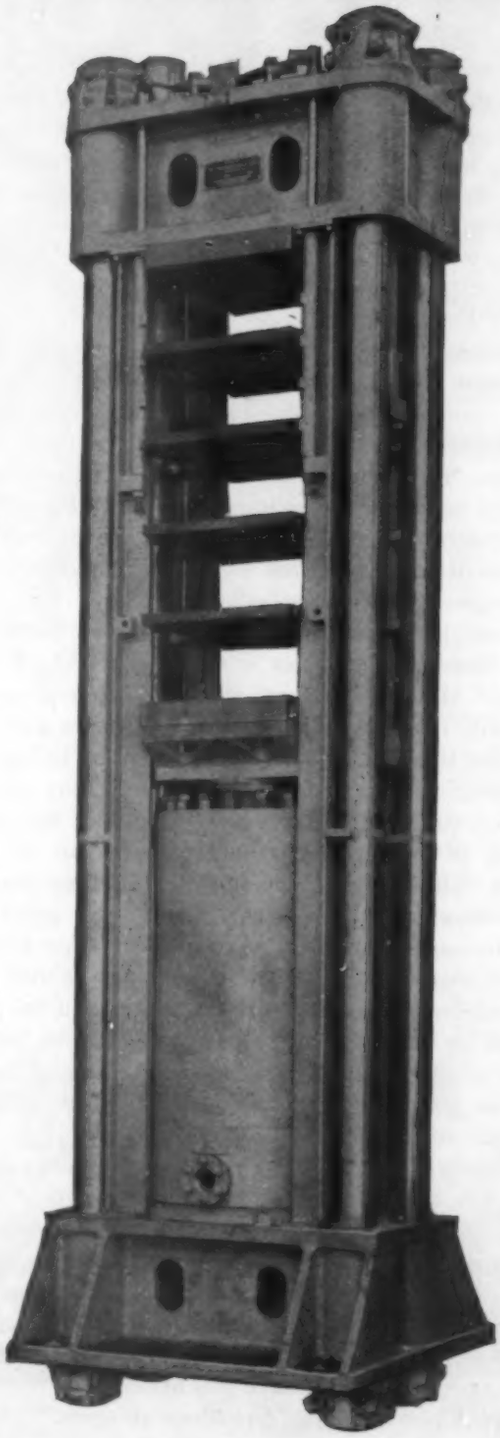
e. Authority of the technical and engineering division to elect a chairman and officers and to conduct their own meetings.

Plan II.

If S.P.E. feels that it will lose its independence by adoption of the above plan, then

a. S.P.E. shall continue as a separate technical and engineering society but with a pared down budget that will not be dependent upon such things as the income from shows nor any other extraneous activity. Revenue

BETHLEHEM *Custom-Built* HYDRAULIC PRESSES



Whatever your need in large hydraulic presses—see Bethlehem first. There are no stock models to limit your choice at Bethlehem; every press is custom-built to an individual order. This means that the finished machine has *all* the features you want, down to the smallest detail.

Painstaking care goes into the engineering and building of every Bethlehem press. As a result, deflection is minor—held to an absolute minimum. Crosshead design insures a true, regular advance in a direction perpendicular to the plane of the work—a vitally important feature in both hot-plate and metal-working machines.

We are equipped to supply presses with or without self-contained or separate hydraulic power system, such as pumps, accumulators, valves, intensifiers, shock absorbers, piping, and accessories. When you are planning your next hydraulic press or system, ask Bethlehem to work with you. One of our engineers will be glad to sit in as consultant, with no obligation on your part.

HYDRAULIC PRESSES FOR PLASTICS . . . WALLBOARD . . . FIBER BOARD . . . VULCANIZING . . . METAL-FORMING . . . AND OTHER APPLICATIONS

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

★ BETHLEHEM STEEL ★

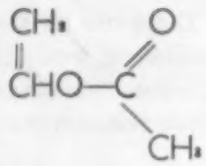
NIACET

Trade Mark

UNPOLYMERIZED

VINYL ACETATE

(STABILIZED)



Boiling Range 71.8° to 73°C

Vinyl Acetate can be polymerized to form resins with exceptional bonding qualities for wood, glass, metal and fibre.

Vinyl Acetate can be used for synthesis of a-b-dichloroethyl acetate, b-monochlor ethyl acetate, b-chloro acetals, 2-amino thiazole, chloroacetaldehyde and many others.

Containers:—

410 lb. drums

62,500 lb. tank cars

For further information write to:



should come from membership dues only.

b. A carefully screened membership with eligibility based strictly on certain qualifications that befit a professional society.

c. A graded plan of membership to contain

1. Fellows—the older and experienced of the industry to be admitted for a high fee.
2. Associates—beginners in the industry to be admitted for a nominal fee.
3. Sustaining members—from raw materials producers, publishers and others.
4. Each group would have adequate representation on the Board of Directors.

d. Enough money would have to be raised through memberships to provide for a sound technical and engineering program. Exhibits and displays at the annual meetings should be limited to those reflecting technical and engineering advances; the cost to exhibitors to be nominal and not for purpose of producing a profit. A special committee would screen exhibitor's applications to eliminate the unfit.

If S.P.E. should prefer the second plan they would then be asked to cooperate with S.P.I. in order to eliminate duplicate activities, but would operate as a completely independent group to cooperate with S.P.I. local chapters under joint chairmen so as to unify local meetings. For example, in California S.P.E. and S.P.I. technical activities are conducted by an S.P.I.-S.P.E. member acceptable to both groups. Time and again it has been demonstrated that the technical and engineering groups can work together.

In carrying on negotiations for a settlement between these three plastics groups (the S.P.I., S.P.E. and P.M.M.A.), it is hoped that all their representatives will remember that none of them is guiltless. A "Holier than Thou" attitude as well as a "belligerent bellicosity" will only add to the tension. May we suggest that the meetings be conducted under the chairmanship of an impartial moderator who has no connection with the plastics industry but will keep the conversations on a high plane, direct and to the point and thus eliminate side issues. We would further suggest that all representatives to these meetings be men who have not been connected with negotiations in the past. We believe that a new group will have a far greater chance of success in eliminating the feelings of hostility, false pride and prejudices that have been built up over this controversy.

Certainly this industry must put its house in order. With the elimination of this comparatively minor trouble, industry can get down to coping with the problems of competition with other materials, trade practices, government relations, public relations and supply problems that are coming in the future. Your editors have definitely ascertained that the disposition of all concerned is to resolve this little tiff.

The call has come for "business statesmen."



Where Teamwork is Tops . . .

at GERING'S, every assignment is a contest; every man alert to score another "win" in Plastic Prestige . . .

We are concerned with Prime Powders as well as converting scrap and rejects into practical, usable material . . . Twenty-five years of accumulated wisdom in the ways of Plastic has developed the "Gering Touch" . . . a talent for revitalizing that goes far beyond mere "reclaiming."

1922
25th
ANNIVERSARY
1947

Your SCRAP will be bought outright—at a favorable price—or reclaimed *and* revitalized and returned to you, within costs that have won—*and kept*—regular, *satisfied* customers.

REJUVENATORS OF THERMOPLASTIC *Scrap*

CELLULOSE ACETATE—BUTYRATE—VINYL—ETHYL CELLULOSE—POLYSTYRENE

Write us for details; or
Telephone: CRanford 6-2900
Cable Address: "Gering" Kenilworth, N. J.

GP
PLASTIC MATERIALS

GERING PRODUCTS, Inc.

NORTH SEVENTH ST. KENILWORTH, N. J.

"Masters of Magic in Thermoplastic conversion"

COTTON FABRICS

FOR REINFORCING

PLASTICS

★

J. H. LANE & CO., Inc.

250 W. 57th St. · New York, N. Y.

WATLOW STRIP UNITS

ELECTRIC PRODUCTION HEATING AT ITS BEST...



Engineered for permanent fit

Send for this catalog



Whether your heating requirements call for an exact local heat application — or for a large expanse, Watlow Units perform perfectly. Accurate temperature control and resistance to burn-outs. Watlow Strip Units are available in 1½" to 3" widths, 4" to 72" lengths, 115 V to 230 V ratings. Strip unit assemblies, in many types and sizes, are recommended for efficient convection heating.

SPECIALISTS IN ELECTRIC HEATING UNITS

WATLOW

ELECTRIC MANUFACTURING COMPANY

1328 N. 23d St. St. Louis 6, Mo.

Plastics and coal

(*Continued from page 93*) prevention, dyestuffs and rubber chemicals. Some tar does not contain naphthalene at all.

Phthalic anhydride

Present producers and their estimated capacity for phthalic anhydride are:

American Cyanamid Co.	45,000,000 lb.
Monsanto Chemical Co.	30,000,000 lb.
National Aniline	30,000,000 lb.
Barrett Co.	20,000,000 lb.
Koppers Co., Inc.	8,000,000 lb.

Sherwin Williams Co.; E. I. du Pont de Nemours & Co., Inc.; Reichold Chemicals, Inc., and the Oronite Chemical Co., which produces it from ortho-xylol, manufacture smaller quantities. Total capacity for phthalic anhydride is presently estimated at 170,000,000 pounds.

It is interesting to note that Barrett Co. and Koppers Co., Inc. (two of the companies listed above) along with Reilly Tar and Chemical Co. and U. S. Steel Corp. are the principal coal tar distillers in the country. All the remaining companies mentioned above are at present dependent upon outside coal tar distillers for their napthalene. One of the above-named companies is expected to come in with a new supply this coming summer with what is described as a combination phthalic and maleic anhydride plant.

In the highest production year (reached during the war) output was about 125,000,000 pounds. This fell off to around 100,000,000 lb. in 1946. The vinyl branch of the plastics industry which hopes to reach a production figure of 300,000,000 lb. of vinyl resin in 1948 would alone demand at least 100,000,000 lb. of this plasticizer. The alkyd resin and dyestuff industries are growing fast and their demands are comparable or even greater than plastics.

The alkyd resins, currently requiring more phthalic anhydride than vinyl plastics, are in great demand for protective coatings used on automobiles, refrigerators and interiors. The Navy supposedly used about 10,000,000 lb. for lay-away equipment in 1946 but that program should be finished soon. It is believed, however, that demand will continue from 40 to 50 percent greater than prewar, at least until the housing program is substantially completed.

Dye manufacturers also want great quantities of phthalic anhydride for vat dyes for which it was found particularly effective in war uses.

It does not seem possible that napthalene from coal tar can meet the expanding needs. Petroleum derived phthalic anhydride may eventually fill the gap although a price differential of from 5 to 10 cents may be expected.

DURITE
PLASTICS



INDURATING RESINS

Rubber topographic model being removed from mold of plaster of paris indurated with DURITE resin to increase wear-resistance and the maintenance of surface detail under repeated use. Model prepared under the direction of the Chief of Engineers by the Army Map Service, War Department, Washington, D. C.

DURITE PLASTICS INCORPORATED • 5000 Summerdale Ave. • Philadelphia 24, Pa.

Exact Weight Scales

For Dependable, Adaptable, Accurate Control Measures in Plastic Operations . . .



Place dependability at the top when you evaluate scales for plastic operations. Adaptability to your work is next. Important are simple construction, trouble-free operation, toughness and fraction-ounce accuracy. All of the above features have been built into EXACT WEIGHT Scales for compounding plastic formulae . . . blending colors for uniformity and checking finished molds. Every model is designed and manufactured not only solely for plastic work but for the particular operation to be handled. The fact that the largest as well as the smallest plastic manufacturers are using and continue to use these outstanding scales should be evidence of their worth and performance. Write for details for your business.

Sales & Service from Coast to Coast

INDUSTRIAL PRECISION

Exact Weight Scales

THE EXACT WEIGHT SCALE COMPANY

630 W. FIFTH AVE. COLUMBUS 8, OHIO

Dept. AC, 783 Yonge St. Toronto 5, Canada

News of the industry

(*Continued from page 188*)

Midwest S.P.I. meet—The Midwest Chapter of S.P.I. will hold its March meeting at the Edgewater Beach Hotel, Chicago, Ill., on March 20. A forum on "Merchandise buyers' critique of plastics" will be conducted by C. N. Sprankle, sales manager for Sandee Mfg. Co., and will be presented by buyers of Sears Roebuck & Co. and Montgomery Ward & Co.

Quebec Rubber and Plastics Group—The Quebec Rubber and Plastics Group heard A. R. Rowzee of Polymer Corp. discuss synthetic rubber prospects at a meeting Jan. 8.

Central Ohio Section of S.P.E.—The Central Ohio Section of S.P.E. met at Granville Inn, Granville, Ohio, Jan. 17. Participants in a panel discussion on low density plastics were L. E. Cheyney, R. A. Clark and T. J. McCuistion, all of Battelle Memorial Institute.

Plastics Products Addresses

(mentioned on pages 109 through 116)

Amb-A-Tip Cigar Co., 1200 W. North Ave., Baltimore, Md.
Angelica Jacket Co., 107 W. 48th St., New York City
Arnold Plastic Co., 612 Front St., Toledo 5, Ohio
Cambridge Molded Plastic Co., Cambridge, Ohio
Clover Leaf Plastic Co., 901 S. Vandeventer Ave., St. Louis 10, Mo.
C. L. S. Products Corp., 6815 Hamilton Ave., Pittsburgh, Pa.
James L. Decker Products Co., 8509-15 Higuera St., Culver City, Calif.
Emerson Radio & Television Corp., 111 8th Ave., New York City
Fairbanks-Murray, Inc., 448 S. Hill St., Los Angeles 13, Calif.
Fisher Plastics Corp., 119 Elmwood, Boston, Mass.
Hero Mfg. Co., Middleboro, Mass.
Illinois Baking Corp., 2230 S. Union, Chicago, Ill.
Jessall Plastics, Inc., 14 Sigourney, Hartford, Conn.
John M. Maris Corp., 52 Walker St., New York City
Merland Mfg. Co., 19 W. 34th St., New York City
Plastimold Corp., 61 Union St., Attleboro, Mass.
Precision Specialties, Inc., 210 N. Western Ave., Los Angeles 4, Calif.
Pressmaster Co., 5784 Santa Domonica, Los Angeles 27, Calif.
Protex Products Co., Inc., 347 Fifth Ave., New York City
Reinhold-Geiger Plastics Corp., 8763 Crocker St., Los Angeles, Calif.
Reliance Molded Plastics, Inc., 387 Charles St., Providence, R. I.
Mary Rodney, 225 Fifth Ave., New York City
Rothco Products Co., 145 N. 6th St., Philadelphia, Pa.
St. Louis Plastic Moulding Co., 4605 Olive St., St. Louis 8, Mo.
Transplastic Mfg. Co., Inc., 133 W. 24th St., New York City
Traver Corp., 358 W. Ontario, Chicago, Ill.
True Art Fly Co., Gardner, Mass.
Universal Plastics-Jiggs-Penny Corp., 270 Madison Ave., New York City
Victory Plastics Co., Hudson, Mass.
Wood Lines, Inc., Woodside, L. I., N. Y.

Stock Mold Addresses

(mentioned on page 180)

1733-1734 International Molded Plastics, Inc., 4387 W. 35th St., Cleveland, Ohio



"Flexol"

Trade-Mark

PLASTICIZERS

"FLEXOL" PLASTICIZERS are designed to meet industry's expanding needs for products with good general characteristics such as compatibility and low volatility. In addition, each "FLEXOL" PLASTICIZER is outstanding in producing one or more special properties such as low-temperature flexibility, resilience, or high impact strength.

"FLEXOL" PLASTICIZERS are successfully serving industry in lacquers, artificial leathers, vinyl films and sheetings, vinyl butyral safety glass, and molded and extruded products based on the vinyl resins and cellulose derivatives.

The "FLEXOL" PLASTICIZERS shown are in commercial production. Several more are available in research or development quantities. Consult us on availability.

Our laboratories have prepared extensive data on the performance of the "FLEXOL" PLASTICIZERS for many uses. This information will assist you in selecting the right "FLEXOL" PLASTICIZER or mixture of plasticizers for your needs.

COMPATIBILITY OF "FLEXOL" PLASTICIZERS (20% OF COMPOSITION) WITH VARIOUS RESINS

	DOP	3GH	3GO	4GO	TOF	B-400	8N8
Vinyl Acetate	I	C	SI	C	C	I	C
Vinyl Butyral	C-L	C	C-L	I	C	I	C
Vinyl Chloride	C	C	C	C	C	I	C
Vinyl Chloride-Acetate	C	C	C	C	C	I	C
Cellulose Acetate	I	I	I	I	SI	I	I
Cellulose Acetate-Butyrate	C	C	C	SI	SI	I	—
Cellulose Nitrate	C	C	C	C	C	C	C
Ethyl Cellulose	C	C	C	C	C	I	C
Synthetic Rubbers	C	C	C	C	C	I	C

C—Compatible S—Slightly
I—Incompatible L—Plasticizer sweats out

A booklet on the general function of plasticizers and the specific uses of "FLEXOL" PLASTICIZERS, Form-5882, may be of help in your application. Phone or write our nearest office for this booklet or for samples and prices.

"Flexol" is a registered trade-mark of Carbide and Carbon Chemicals Corporation.

SYNTHETIC ORGANIC CHEMICALS

CARBIDE AND CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

UCC

30 East 42nd Street, New York 17, N. Y. Offices in Principal Cities

Distributed in Canada by Carbide and Carbon Chemicals, Limited, Toronto

How our membership in the Audit Bureau of Circulations gives constant protection to the advertising in these pages.

THE Audit Bureau of Circulations, organized in 1914, is a cooperative and nonprofit association of more than 2800 publishers, advertisers and advertising agencies in the United States and Canada. Working together, these buyers and sellers of advertising space have established definite standards for measuring and uniform methods for auditing the circulation of periodicals and newspapers. Only publications with paid circulation are eligible for membership in the A.B.C.

The Bureau has a staff of experienced circulation auditors who make an annual audit of the circulations records of each publisher member. Based on these audits the Bureau issues A.B.C. reports which tell how much circulation a publication has, how much subscribers pay, how the circulation was obtained, where it goes and many other facts essential to the sound investment of advertising money. Of special importance to business paper advertisers is an occupational or business breakdown of the paid subscribers. This tells you how much of the total circulation represents a logical audience for your advertising and a market for your merchandise. In addition to the annual Audit Reports, the Bureau issues semi-annual Publisher's Statements.

Guesswork and waste are avoided when you select advertising media on the basis of factual information. Always make A.B.C. reports your starting point when you buy advertising space.

This business paper is a member of A.B.C. Ask for a copy of our A.B.C. report and then study it.



SEND THE RIGHT MESSAGE TO THE RIGHT PEOPLE

Paid subscriptions and renewals, as defined by A.B.C. standards, indicate a reader audience that has responded to a publication's editorial appeal. With the interests of readers thus identified, it becomes possible to reach specialized groups effectively with specialized advertising appeals.

MODERN PLASTICS

ABC = *AUDIT BUREAU OF CIRCULATIONS* = *Facts as the Basic Yardstick of Advertising Value*



How Big?...How Many?...How Soon?

Is your next product application going to call for real volume production? Are you looking for a molder that is BIG in every sense of the word? Then turn to Hardy, for here you'll find capacity for speedy production on any scale. A battery of over 50 injection molding presses ranging in size from 8 to 24 ounces, guarantees you steady, uninterrupted processing on long, heavy runs. And every unit in Hardy's *complete* custom molding service is geared to match this unsurpassed capacity.

The 7-story Hardy plant is a huge custom molding resource. It includes a design and engineering staff — and a tool department equipped with the most modern machinery and manned by highly skilled craftsmen with over 20 years of experience in precision mold construction. There are complete fabricating and finishing departments with facilities for metals and plastics assemblies. All at your service now!

Hardy's facilities are such that one or more presses can be immediately assigned to the production of introductory quantities of your application . . . and as market demands increase, there is sufficient equipment available to pace your greatest possible needs. A model or blueprint will bring you prompt quotations on molds and molding costs. Inquiries invited.



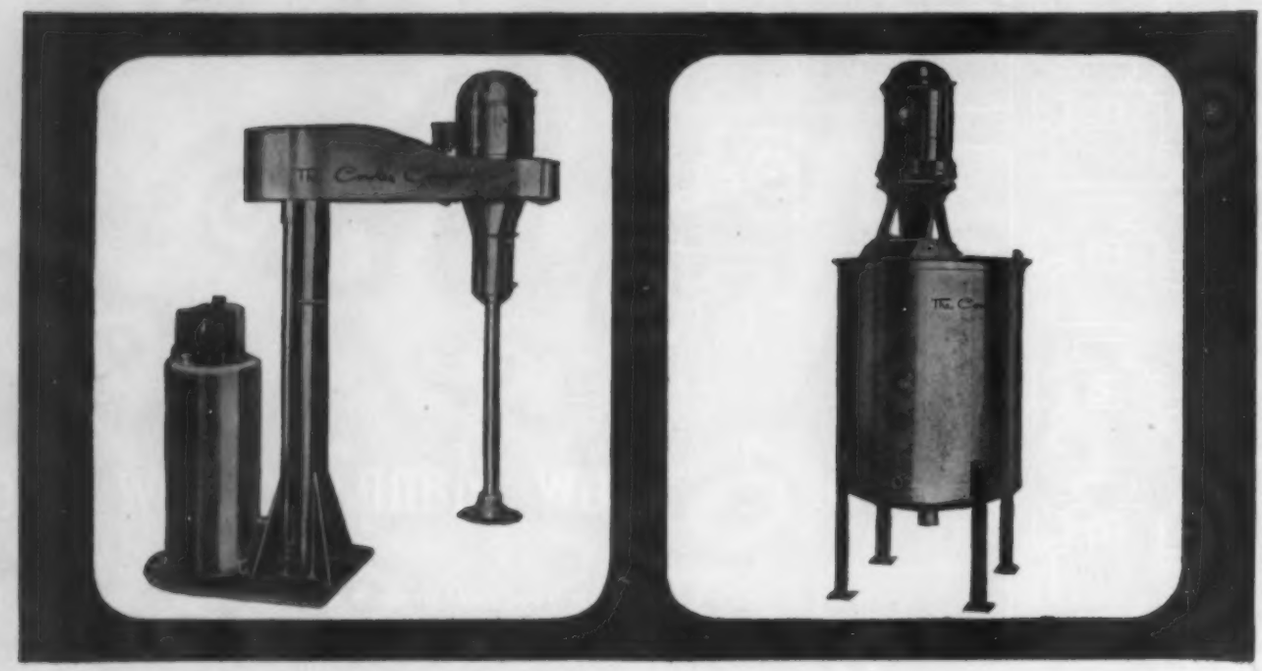
This is the modern Hardy plant — seven floors, 200,000 sq. ft. Note adjacent main-line railroad siding.



HARDY PLASTICS & CHEMICAL CORPORATION

ONE JUNIUS STREET, BROOKLYN 12, N. Y.

Now—dissolve or disperse 25 minutes to 10½ hours faster



COWLES DISSOLVER

the high-speed machine with molecular-scrubbing action

Two to twenty times faster than conventional mixers, the scientifically designed impeller of the Cowles Dissolver turns at a high rate of speed. It sets up components of laminar flow, resulting in interface shear between multiple surfaces of molecular thickness, each moving at a rate different from its neighbors. The high velocity gradients of these laminae subject every particle of the materials being treated to molecular tensions and scrubbing, greatly accelerating the dissolving or dispersing action, holding undissolved residues to low levels and producing more homogenous mixtures. High viscosities improve the dissolving and dispersing action.

Safe, Silent, Long-Wearing

Sound design and rugged structure . . . plus finely machined materials of high physical properties . . . all assure maximum life with minimum maintenance requirements. A high degree of static and dynamic balance has been achieved in the rotating parts, eliminating noise, vibration, splash and dead spots. Turbulence and aeration are thus held at low levels, though controlled aeration can be had if desired.

Models With or Without Tanks

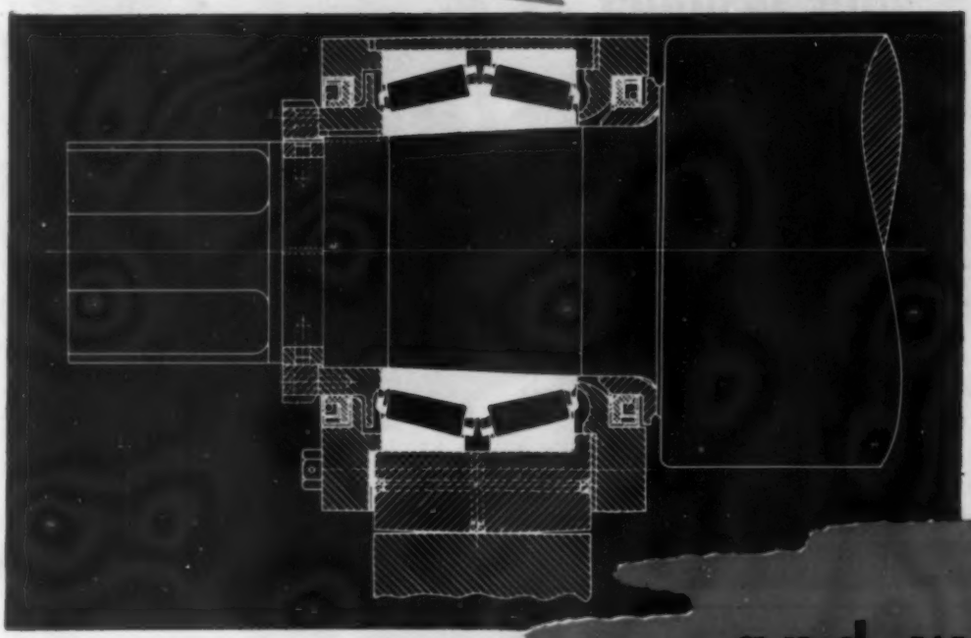
In two models—with built-in tanks in capacities of 100 gallons, 250 gallons and 500 gallons, or for use in tanks brought to the machine. Motor speed and horsepower adjusted to the need. Explosion-proof motors on special order. Write for descriptive folder, or ask for a technical representative to call.

5 Years of Commercial Test Show Cowles Dissolver Up to 10½ Hours Faster on Typical Operations

Type Operation	*Material*	*Cowles Dissolver*	*Standard Mixer*
Gum Cutting	Rosin	1½ Hrs.	12 Hrs.
Synthetic resin dissolving	Vinylite	1 Hr.	6 Hrs.
N/C solution	Nitrocellulose	12 Min.	90 Min.
Tinting	Enamel	5 Min.	30 Min.
Pigment dispersion	Heavy enamel	6 Min.	150 Min.
Coating suspension	H. T. Clay	1 Hr.	9 Hrs.

The Cowles Company INCORPORATED — Cayuga, N. Y. *Associate: Alexander Fleck, Ltd., Ottawa, Ont.*

PUT THIS BEARING ON YOUR *Calender Rolls*



and watch performance improve

With the new Timken DIT Type Balanced Proportion Bearings on the roll necks of your rubber and plastics calenders you will get greatly increased roll neck rigidity with minimum roll deflection under all load conditions because these bearings make possible larger, stronger roll necks plus maximum radial, thrust and combined load capacity.

Result, accurate product control; lower operating cost; reduced maintenance; extended equipment life.

Note the simplicity of the bearing mounting; this makes it much easier to assemble the bearings on the roll necks and to remove them when necessary.

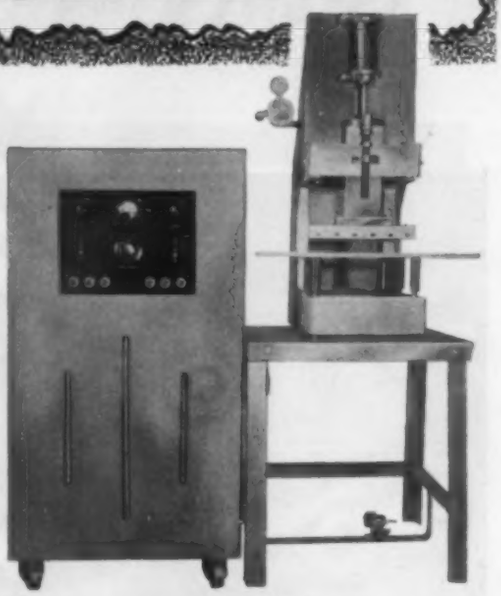
For specific information covering the application of Timken Balanced Proportion Bearings to your calenders consult the calender builder or our engineers. The Timken Roller Bearing Company, Canton 6, Ohio.

LOOK for the trade-mark "TIMKEN" on every bearing that goes in your equipment.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

Kabar HEATSEALER

INCREASES your production
IMPROVES your product
REDUCES your costs



Electronically heatseals vinylite, koroseal, geon, saran, and almost every other thermoplastic, the most efficient and economical high frequency unit made.

Gives permanent, flawlessly airtight and water-proof seams in the manufacture of such items as belts, beachballs, tobacco pouches, baby pants, air pillows, life preservers, inflatable toys and a host of other products including long-life, weatherproof packaging of perishable drugs for export.

Installs by plugging into 110 volts, 60 cycle, AC current. Half hour of instruction by one of our staff engineers teaches the least skilled worker to operate it efficiently *at a production rate.*

Kabar MANUFACTURING CORP.

ARRANGE FOR DEMONSTRATION TODAY
WRITE: 100 W. 42 St., New York 18, N. Y. CALL: BR 9-9696

Sales Offices and Showroom: 100 W. 42nd Street, New York 18, N. Y.
Laboratory and Factory: 1907 White Plains Road, New York 60, N. Y.

NEW Liquid Casting Plastic

FOR MODELS, MOCK-UPS SMALL OBJECTS

MANUFACTURERS - INDUSTRIAL USERS DESIGNERS!

Here's the answer to your problem of odd shapes and sizes in plastic. CAST YOUR OWN with CASTOLITE Liquid Casting Plastic. Crystal clear or may be dyed to any desired color. Ideal for making models, mock-ups, preserving specimens. Pours without heat or pressure and cures at low temperature. Simple shop equipment required. Excellent machining properties, structural and heat stability. Most common chemicals have no effect on this clear hard finish plastic.

SPECIAL CASTO-KIT $3.35

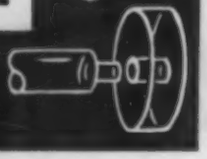
Special new experimental Kit, $3.35 postpaid. Contains everything necessary to conduct experiments or make several small objects. Includes 1 lb. liquid CASTOLITE, catalyst, buffing compound, measuring dropper, abrasives, etc. Illustrated Instruction Manual shows simple step-by-step method. Special rates on quantity orders.

The CASTOLITE COMPANY, Dept. C-51, Box 211, Kenilworth, Ill.



Castolite LIQUID PLASTIC
TRADEMARK

MAKE YOUR OWN SHEETS • BLOCKS • RODS IN ALL COLORS





BUTTONDEX is a source for service and dependability. BUTTONDEX is fully equipped for molds, cavities and hobs. BUTTONDEX engineers will gladly consider your specific needs.

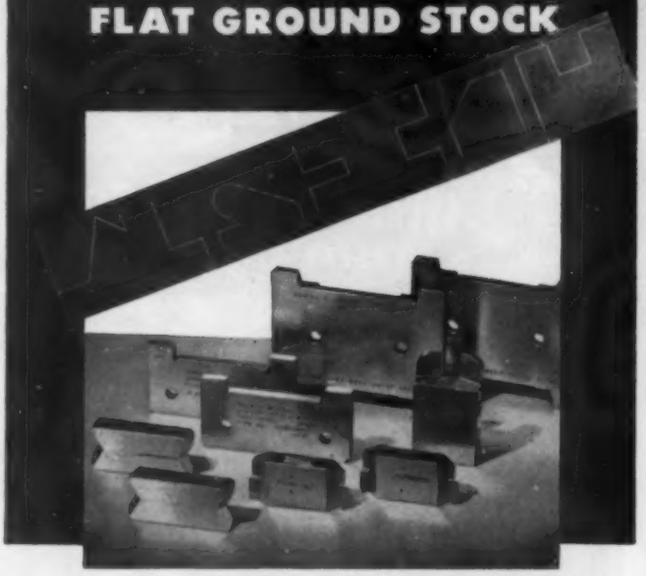
ButtOndeX CORPORATION

"Your Problem is Our Product" · 386 Fourth Ave., New York, N.Y.

Get
SMOOTH SURFACES
for
Accurate Layout
Work



. . . USE
SIMONDS
"RED STREAK" Precision-Finished
FLAT GROUND STOCK



MAKE YOUR OWN GAUGES, dies, jigs, templates, stamps, shims, machine parts and small tools . . . with Simonds Oil Hardening Flat Stock, made of Simonds own alloy tool steel, uniformly annealed for easy machining and proper hardening.

SAVE TIME AND MONEY with this Flat Stock which is cut to 18" length and accurately ground to standard thicknesses and widths. *No need for the expensive machining required to grind ordinary stock to size.*

145 STOCK SIZES . . . special sizes to order. Get "Red Streak" Flat Ground Stock from your Simonds distributor, or the nearest Simonds office. Immediate delivery from stock on most sizes.

BRANCH OFFICES: 1350 Columbia Road, Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 416 W. Eighth St., Los Angeles 14, Calif.; 228 First St., San Francisco 5, Calif.; 311 S. W. First Ave., Portland 4, Ore.; 31 W. Trent Ave., Spokane 8, Washington. *Canadian Factory:* 595 St. Remi St., Montreal 30, Que.

SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASS.
Other Divisions of SIMONDS SAW AND STEEL CO. making Quality Products for Industry





PLASTIC
MOLDING
takes skill
too!

TRADE MARK

This Trade Mark, the "Circle K and J," on a molded piece has a definite value to you. It means that in every step of the process from design to finished piece, you have had the advantage of the skill and experience of men who not only know molding, but who make the molds as well. Thus complete control of the quality of your product is assured.

KUHN & JACOB
MOLDING & TOOL CO.
1200 SOUTHARD STREET, TRENTON, N. J.
TELEPHONE-TRENTON 5391

CONTACT THE K & J REPRESENTATIVE NEAREST YOU

S. C. ULLMAN, 55 W. 42ND ST., NEW YORK, N. Y.
TELEPHONE - PENN 3-0346

WM. T. WYLER, BOX 126, STRATFORD, CONN.,
TELEPHONE - STRATFORD 6-4496

The "Write" way...

to sell a product



is in an

Arnrus

Plastic Container

More and more, Americans are becoming conscious of the pleasure of writing with fine pens. And, more and more, it is the right kind of packaging which helps to sell these pens.
What better way to display merchandise than the Arnrus way . . . with a transparent Plastics container . . . a container that form-fits the product and shows its full beauty as clean and as spotless as the day it left the factory.
Transparent Plastics packaging by Arnrus is the profitable way to join the product and the consumer. And it's economical. Write today for information.





THE NEW SAFETY "UTILITY"

MARKING OUTFIT

Holder Holds Nine Sizes of Type From 1/32" to 1/4"

Designed for light stamping work, the "Utility" outfit is ideal for marking etched plates, tags, keys, stock checks; brand names or stock numbers on steel bars; special coding, serial numbering, identification, inspection and other marking where two or more characters are required.

Send for Literature and Prices

M.E. CUNNINGHAM CO.
SAFETY STEEL STAMPS

50 E. CARSON STREET — PITTSBURGH, PA.

INJECTION MOLDS



THE FINEST EQUIPMENT

Whether you need a small mold or one for a 32 oz. machine, we have the equipment and the experience to carry the job from the original design through manufacture, up to the actual production test on our own Lester Molding Machine.

New England Representatives LESTER Injection Molding Machines

STANDARD TOOL CO.
LEOMINSTER, MASS.

Outfitters to Plastics Mfrs. Since 1911


Engineering
The application of sound engineering may provide you with a better product at less cost. You are invited to consult our engineering department.
MINNESOTA PLASTICS CORP.
366 WACOUTA STREET ST. PAUL 1, MINNESOTA
INJECTION MOLDING
MINCOR
"YOUR PLASTICS DEPARTMENT"



How'd you like to be in our shoes?

At the moment, they're not very comfortable, but we'll fill 'em eventually. That's the way it is with our orders too. They're large and difficult to meet. The delay is unfortunate but the "wait" is worthwhile because when shipments from CONNECTICUT PLASTICS arrive, manufacturers know that these plastic products are molded to individual specifications by skilled craftsmen to guarantee serviceability, satisfaction and higher profits.

"Call on Connecticut"

Custom CONNECTICUT *Plastics* **Molders**

CONNECTICUT PLASTIC PRODUCTS CO.

70 WEST LIBERTY STREET — WATERBURY, CONNECTICUT

IN A CLASS BY ITSELF . . . .

Plasticor MASTER

Hand Operated Plastic Injection Molding Machine

Ideal for Laboratories and Mold Makers

Use it for molding test specimens, color sampling, testing molds, etc. Has full 1½ oz. capacity, generous 15 sq. in. mold area. Packed full of features that make it one of the most versatile and economical molding machines ever offered custom molders, manufacturers, schools, etc. Unique mold nest slashes mold cost. Exclusive back gearing requires only finger tip pressure. No wonder the Plasticor Master created such a stir at the SPE Show. Write for details.

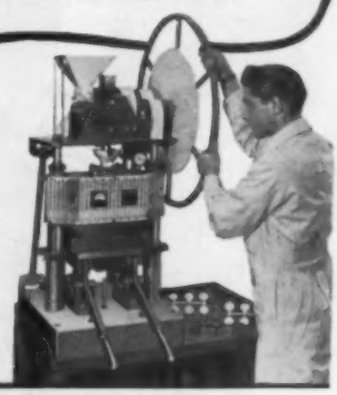
NRK MANUFACTURING & ENGINEERING COMPANY
5650 N. Western Ave., Chicago 45, Ill.

NRK

Never Before — such Performance at such Low Cost

$985

(F.O.B. CHICAGO)



BEAUTIFUL EXHIBITS THRU PLASTICS



COUNTER DISPLAY CREATED FOR

PRO-PHY-LAC-TIC BRUSH COMPANY

Manufacturers of Jewelite Products



Skilled, professional model makers, master craftsmen of W. L. Stensgaard & Associates, Inc., design and create fine displays that sell merchandise.

RATES REASONABLE

36 Pages...420 Illustrations...an Exhibit of Performance. Write for a free copy of it today on your business letterhead.

AMERICA'S LARGEST ORGANIZATION SPECIALIZING IN MERCHANDISE PRESENTATION

W. L. STENSGAARD AND ASSOCIATES, INC.

353 N. JUSTINE ST. • CHICAGO 7, ILLINOIS



BALL & JEWELL MODEL #1 SCRAP GRINDER at the SUPERIOR PLASTIC Corp.

Illustrated is Ball & Jewell rotary cutter #1 in use at the plant of Superior Plastic Corp. Operator is inserting scrap to be ground into re-usable molding powder. Note sturdy construction of this machine, which is strong enough to take scrap up to ¾ inch thick. Also note direct motor drive, removable bin and special design baffled hopper preventing accidents and "kick-backs."

Ball & Jewell grinders are known throughout the entire plastics industry for their reliability. Each one is made with extra heavy castings to give it a greater margin of operating efficiency. All have solid tool steel knives, outboard SKF bearings (sealed against dust) and three interchangeable screens for different-sized granulations. Send for free catalog.



This is #27 in a series of advertisements showing typical Ball & Jewell scrap grinder installations in the plastics industry.

BALL *and* JEWELL

20 Franklin Street, BROOKLYN, N. Y.

Since 1895, Manufacturers of Patent Rotary Cutters

CHICAGO: Neff, Kohlbusch & Bissel. DETROIT: J. C. Austerberry's Sons. LOS ANGELES: Moore Machinery Co. LOS ANGELES & SAN FRANCISCO: Machinery Sales Co. NEW ENGLAND: Standard Tool Co., Leominster, Mass. ATLANTA, GA.: George L. Berry. ST. LOUIS: Larrimore Sales Co. CLEVELAND 22, Ohio: L. F. Willmott, 3701 Latimore Rd. SEATTLE 4, WASHINGTON: Olympic Supply Co. KANSAS CITY, KANS.: Fluid Air Engineering Co. MINNEAPOLIS 20, MINN.: Chas. W. Stone. CINCINNATI, OHIO: Index Machinery Corp. DALLAS, TEXAS: Perry Machinery Corp. AUSTRALIA and NEW ZEALAND: Scott & Holladay (Asia) Pty. Ltd. NEW YORK,16, N. Y., Foreign Distributors: Omni Products Corp., 40 East 34th St. STOCKHOLM, SWEDEN: Ingenjorsfirman Teknova. CANADA: Williams & Wilson, Ltd., Toronto & Montreal. HAWAIIAN ISLANDS: Hawaiian Sales Service, P. O. Box 3498, Honolulu, 11, T. H.

ELECTRO-SET PROCESS PRINTS 5 COLORS ON VINYL and other plastic films!

The Plastics Guild Electro Set Process is the only process of its kind: it prints up to five colors on rolls of vinyl or acetate film. By this process the decorative appeal of brilliantly colored patterns and designs is combined with the durability and water-resistance of plastic film. Moreover, the color is directly embodied in the film—it cannot scrape, peel or flake off.

Films decorated by the Electro-Set process are ideal for use as shower curtains, rainwear, upholstery.

We also emboss and laminate plastic film.

PLASTICS GUILD Corp.

85 Fifth Avenue, Paterson 4, N. J.

New York Office
50 Church Street, New York 7, N. Y.

American Molding Powder and Chemical Corp.

MANUFACTURERS OF

AMPACET

CELLULOSE ACETATE MOLDING POWDERS

• ANY COLOR • ANY FLOW •

Main Office 44 HEWES STREET • BROOKLYN 11, N. Y.

Plant 67 NORTH 9th STREET • BROOKLYN 11, N. Y.

PHONE: EVERGREEN 7-3887 • CABLE: CHEMPROD BROOKLYN



ANOTHER IN A SERIES OF CASE HISTORIES IN WHICH . . .

FELSENTHAL TAKES IT From Blueprint to Product

The new dashboard nameplate and speedometer dial injection molded for the Kaiser car were a designer's dream—but they would have been a nightmare in most plastic production departments . . .

Two colors—green and white—had to be sprayed to make hairline contact, and with ordinary tape masking methods it would have been impossible to prevent overlapping, "bleeding" and ragged edges.

Felsenthal engineers came through with the application of a metal mask and jig, combined with specially-designed masked portions of the casting to prevent "bleeding", enabling us to proceed with high-speed precision spraying . . . The designer's dream became another beautiful reality . . . The kind you can always expect when you bring your problems to Felsenthal.

Est. 1899

FELSENTHAL PLASTICS



G. FELSENTHAL & SONS
4120 W. GRAND AVE., CHICAGO 51, ILL.
INJECTION MOLDING
LAMINATING • FABRICATING
Branch Offices: NEW YORK • DETROIT • KANSAS CITY

INORGANIC PIGMENTS *for plastics*

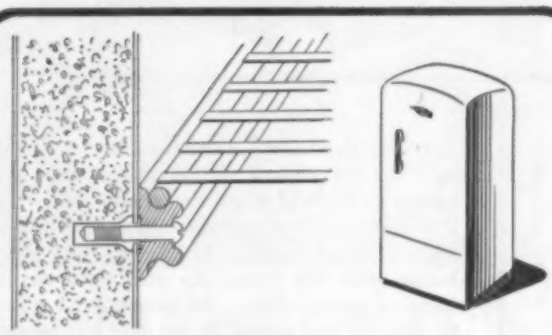
➡ INSOLUBLE
➡ HEAT AND LIGHT RESISTANT

Let us know the application . . .
Get complete details

WRITE B. F. DRAKENFELD & CO., INC.
45-47 Park Place, New York 7, N. Y.

Drakenfeld

RIVNUT LICKS TOUGH FASTENING PROBLEMS



KEEPING AIR-TIGHT SEAL, and not cracking porcelainized metal, extruded plastic strip had to be fastened to interior wall. B. F. Goodrich Rivnuts made it a simple blind fastening job! 8-32 thread blind-end aluminum Rivnuts were inserted into holes of metal wall and upset. Strips were held in place by screw attachments in clean Rivnut threads. Installation time and money were saved, and maintenance was made easy.

NEW "RIVNUT DATA BOOK" *has 40 fact-packed pages of illustrated uses, types, sizes, test data. Write for your free copy to The B. F. Goodrich Company, Dept. MP-37, Akron, Ohio.*



B.F.Goodrich, AKRON, OHIO



AHM

Introducing

SNACK-MASTER*

. . . a perfectly balanced plastic tray for

- HOME PARTIES
- PICNICS
- OFFICE LUNCHES
- TEAS

and many other uses

AMERICAN INJECTION MOLDERS, INC.

Molded of unbreakable, washable plastic in transparent and opaque colors . . . shaped like an artist's palette with thumb-hold and partitions for food, dessert, beverage and napkin . . . **SNACK-MASTER** is designed, engineered and molded by AHM

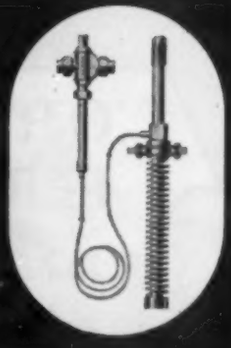
INQUIRIES FROM JOBBERS INVITED.



*T. M. Reg. U. S. Pat. Off. *Patent Pending

Plant and Office: 4238-40 27th St., Long Island City, N. Y. • Phone: IRonsides 6-6746

ACCURATE DRYING CONTROL



For simple, inexpensive temperature control of dryers and ovens specify the new

Sarco type KR-14 MD

It is self contained and self operated; requires no compressed air or electricity. The bulb is extra sensitive for quick response in air. Available in sizes ⅛" to 8", Catalog No. 600. 95F

SARCO SAVES STEAM

SARCO COMPANY, INC.
475 Fifth Avenue, New York 17, N. Y.
SARCO CANADA, LTD., 85 Richmond St. W., TORONTO 1, ONT.



PHENOPREG

Molded Laminates

FOR

FUNCTIONAL APPLICATIONS

There is a PHENOPREG grade suitable for any type of molded laminate having a functional application requiring high strength, high impact value or abrasion resistance. Below is a partial list of parts molded from PHENOPREG materials:

SAFETY HELMETS	INSTRUMENT BOXES
CASTER WHEELS	MOLDED RINGS
ARM RESTS	ROLLERS
GEARS	TRAYS

We invite your inquiries on PHENOPREG materials for similar applications.

FABRICON PRODUCTS, INC.
PLASTICS DIVISION
VInewood 1-8200
1721 PLEASANT AVE. • RIVER ROUGE, MICH.

in PLASTICS you've got to KNOW this Scrap business!



We can offer reprocessed plastic materials which, for certain purposes, may be used to lower your production costs without lowering your quality.

If you wish to re-use your own scrap we can grind, magnetize, separate and rework it and return it to you clean and ready for use.

On the other hand, we will buy your thermoplastic scrap, rejected molded pieces and obsolete molding powder.

IT WILL PAY YOU TO CONSULT US.

CELLULOSE ACETATE • POLYSTYRENE • METHYL METHACRYLATE

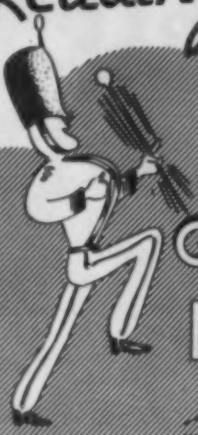
A. BAMBERGER CORPORATION

44 HEWES STREET, BROOKLYN 11, N. Y.

PHONE EVERGREEN 7-3887 • CABLE CHEMPROD BROOKLYN

CELLULOSE ACETO BUTYRATE • POLYVINYL RESINS, ETC

Leading the field!



INJECTION AND COMPRESSION MOLDINGS

Recto

MOLDED PRODUCTS INC.

CINCINNATI 9, OHIO MELROSE 6862

DETROIT L. S. HOUSE

3-167 GENERAL MOTORS BLDG. MADISON 5781

ORGANIC PEROXIDES

CATALYSTS FOR POLYMERIZATIONS
DRYING ACCELERATORS • OXIDATION AGENTS • BLEACHING AGENTS

LUCIDOL
(BENZOYL PEROXIDE)

LUPERCO
(PEROXIDE COMPOUNDS)

ALPEROX C
(TECHNICAL LAUROYL PEROXIDE)

LUPEROX
(PEROXIDE PASTES)

Special Organic Peroxides

* REGISTERED TRADEMARK



LUCIDOL DIVISION

NOVADEL-AGENE CORPORATION
BUFFALO 5, NEW YORK



OUR PLASTIC DIVISION with plants at Plymouth, Wis., and Ogdensburg, N. Y., enables us to offer . . .

QUALITY PRODUCTION, LOW MATERIAL COST, WITH PROMPT DELIVERIES IN BOTH THE WESTERN AND EASTERN MARKETS.

See our exhibit in the American Toy Fair, Room 223, Hotel Breslin, New York City

- WE SPECIALIZE . . . In custom molding; In producing and marketing a fine line of plastic products in the Toy and Novelty field; In producing plastic parts for later assembly.
- We also specialize in designing and producing plastic items in competition with wood turnings and die castings.



The CLEVELAND CONTAINER Co.
6201 BARBERTON AVENUE CLEVELAND 2, OHIO
PRODUCTION PLANTS also at Plymouth, Wisc., Ogdensburg, N. Y., Chicago, Ill., Detroit, Mich., Jamesburg, N. J.
PLASTICS DIVISIONS at Plymouth, Wisc., Ogdensburg, N. Y. • ABRASIVE DIVISION at Cleveland, Ohio
New York Sales Office—1186 Broadway, Room 223
IN CANADA—The Cleveland Container Canada Ltd., Prescott, Ontario



So Simple Anyone can
ENGRAVE
on Plastic and Metal

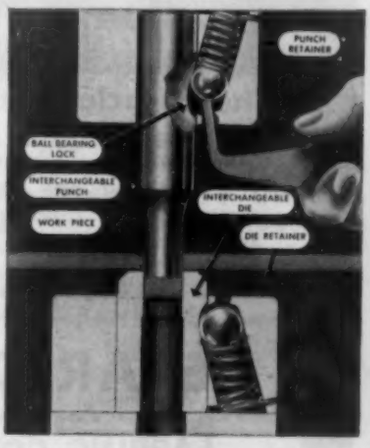
NEW HERMES PORTABLE

The handy, accurate machine that every plant NEEDS for speedy production lettering of name plates, small panels, novelties, serial numbers, part numbers, etc.

NEW HERMES, INC.
13-19 University Place • New York 3, N. Y.

PUNCHES and DIES are *Quickly* INTERCHANGEABLE

Allied's R-B Interchangeable Punches and Dies are quickly installed for trouble-free production in the metal-working and plastics industries. They are available from stock in *standard* round, oblong and square shapes of almost any required size. Specials of any size, shape or material are promptly furnished to your specifications—and delivery dates are *dependable.*



Write today for large illustrated R-B Catalog.

ALLIED PRODUCTS CORPORATION
Department 21 • 4622 Lawton Ave.
Detroit 8, Michigan

Specialists in Silvering

Investigate the use of our lustrous, satin-smooth, silver and gold effects on your molded or fabricated plastics. Our unique silvering process produces finishes of uniform high quality in volume production.

Send a sample of your product for finishing by our newly developed method . . . mirrored polystyrene buttons and other similar small products. We also can offer the trade gold and silver effects on any styrene object for first surface mirror effects. Write, wire or phone for complete information on the use of plastic metallizing to enhance the sales-appeal of your products.

New Jersey Sprayed Products Co., Inc.

244 MILL STREET, BELLEVILLE 9, NEW JERSEY

TELEPHONES: BELLEVILLE 2 { 2232-3 / 4062

MIRROR FINISHES
on MOLDS, etc.
. . . in MINUTES instead of HOURS

The Miracle Demonstration At The Plastics Exposition

Don't miss it at Booth #609 in Chicago—May 6-10

War-developed new diamond abrasive removes grind marks, scratches, etc., and puts MIRROR FINISHES on molds with INCREDIBLE SPEED. Saves many hours in POLISHING. Easy to handle . . . Foolproof . . . Labor-Saving.

STAR DUST

Pure Diamond

LAPPING COMPOUND

"Write for Booklet"

ACE ABRASIVE LABORATORIES

1 SPRUCE STREET NEW YORK 7, N. Y.



We never go off . . . Half COOKED!

No matter what the plastic molding job is COOK KNOW-HOW takes hold at the beginning . . . an entire team of plastic craftsmen organize to supply the answer . . . whether it be in the experimental, design, development or manufacturing division.

It's a proved fact that in New England's most complete small plastic mold shop NO ONE GOES OFF HALF COOKed on any plastic molding problem!

Why not let Larry Cook have a look at your plastic problem NOW?

LAWRENCE H COOK, INC.

65 MASSASOIT AVENUE
EAST PROVIDENCE 14, R. I.
Telephone EA. 3881



VICTORY*
MOLDS PLASTICS for



AUTOMOBILE
Radio Grilles

TELEPHONE BASES
with Screw Machine Inserts



REFRIGERATOR
Defrosting Receptacles



—AND MANY OTHERS

When America's leaders in industry require precision plastic molding, they choose VICTORY of Chicago—because VICTORY molds plastic parts on die cast and screw machine inserts, also on large metal stampings—with the same exacting tolerance as on the simplest single part.

VICTORY has the skills and equipment to design and build the hand model, make the molds and production tools, mold quality and quantity—also complete assemblies—no matter how intricate.

Whatever your plastic needs—a new product or redesign for added sales appeal—we invite you to send us your specifications for an estimate.



Up to 17 oz. Shots
Automatic Injection Molding
ALL THERMOPLASTIC MATERIALS
Specializing in Large Parts

*VICTORY OF CHICAGO

MEMBER: The Society of the Plastics Industry

VICTORY MANUFACTURING COMPANY
1724 W. Arcade Place, Chicago 12, Ill.
ESTABLISHED IN 1930

Stabilizer SN



for
HEAT-STABILITY
of Vinyl Resins

A new vinyl resin additive offering

- Effective heat stabilization
- Easy handling — fluid consistency
- Transparency with no clouding
- Solubility and compatibility
- Freedom from fire hazard

Use STABILIZER SN

a. in vinyl plastics for high temperature mixing, extrusion, calendering, etc.

b. in vinyl resin films for heat stability in drying or service.

For Samples, Data and Prices communicate with

Advance Solvents & Chemical Corporation
245 FIFTH AVENUE • NEW YORK 16, N. Y.



SOLKA-FLOC, a unique Brown Company product, is a finely divided, chemically purified cellulose fibre. It is steadily finding wider uses in industrial operations for both process and product improvement.

Unexcelled in purity and uniformity, SOLKA-FLOC is produced in a wide variety of physical forms giving unusual combinations of technical properties. Members of the line are unique in the filler field, being excellent binders from non-abrasive organic origin, low in specific gravity and of negligible ash content. The color range of SOLKA-FLOC is from natural cream to pure white. A variety of fibre lengths is available; bulk, apparent density, and absorbency can be controlled. This rare combination of properties has proved its merit in commercial application and SOLKA-FLOC is being profitably adapted to use in the following fields; rubber, plastics, adhesives, protective coatings, ink, filtration, plastic wood, decorative coatings, cosmetics, etc.

For details on how SOLKA-FLOC may be employed to extend supplies of more critical materials, produce new or better finished products, or facilitate manufacturing operations, address our Technical Service Department. Full help will be granted gladly, regardless of your operations, and adequate samples of SOLKA-FLOC supplied.

*Reg. Trade Mark

BROWN COMPANY

FOREMOST PRODUCERS PURIFIED CELLULOSE

PULP SALES OFFICES: 500 FIFTH AVE., NEW YORK 18, N. Y. • 605 CONGRESS ST., PORTLAND 3, ME.
1150 S. DEARBORN ST., CHICAGO 5, ILL. • 55 SUTTER ST., SAN FRANCISCO 4, CAL.
BROWN CORPORATION 630 ST. JAMES ST. BLDG. MONTREAL 2, P.Q., CANADA

..why guess?



Guessing can be hard on your pocketbook in plastic molding too. Improper molding temperature is the principal cause of low tensile strength, warpage and off colors. The surface temperatures of mold cavities are instantly indicated by the Cambridge Mold Pyrometer. This is an accurate and sturdy instrument that is so easy to use that workmen will use it. Send for bulletin.

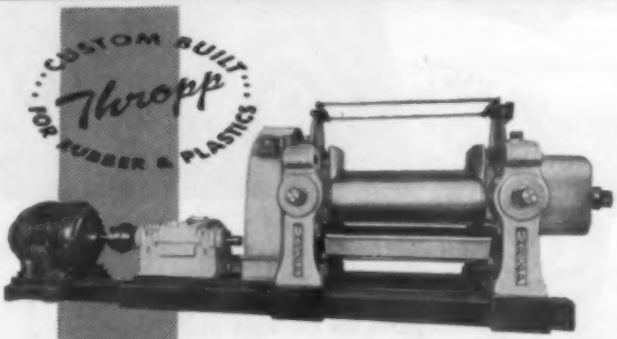


Combination and single purpose instruments

Cambridge Instrument Co., Inc.
3711 Grand Central Terminal, New York 17, N. Y.

CAMBRIDGE
Mold ★ Needle ★ Roll
PYROMETERS

Bulletin 194-S gives details of these instruments. They help save money and make better plastics.



New Hi-Speed MILLS

22" & 22"x60" Extra Heavy Duty

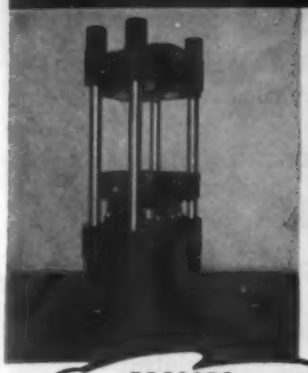
Extra Heavy Duty Individual Motor Driven Mill with 15" diameter journals, having 150 H.P. enclosed herringbone gear drive. Machine is equipped with solid bronze lined bearings having oil closure seals on side of the boxes facing the rolls to prevent oil contamination of the stock. Steel cut connecting gears and Johnson Rotary Joints. Mansel mechanical lubricator and new style guides bored to fit the rolls. This is just one of the many new Thropp precision built mills designed to speed up post war production.

West Coast Representative
H. M. Royal Inc.
Los Angeles, Cal.

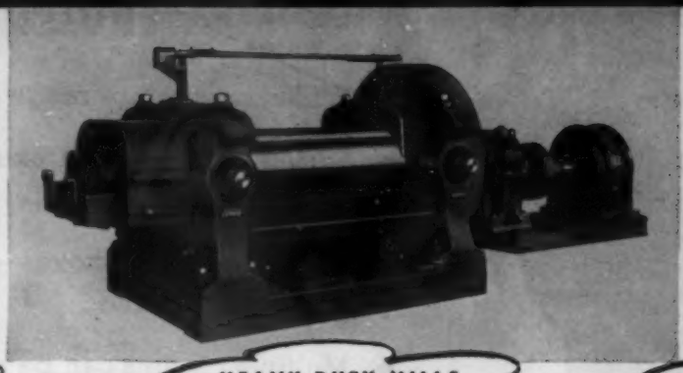
Thropp

WM. R. THROPP & SONS CO.
Trenton, N. J.

RUBBER & PLASTICS PROCESSING MACHINERY



PRESSES



HEAVY DUTY MILLS



LABORATORY MILLS

Sales Representatives

OHIO
DUGAN & CAMPBELL
907 Akron Savings & Loan Bldg.
AKRON, OHIO.

EASTERN
H. E. STONE SUPPLY CO.
OAKLYN, N. J.

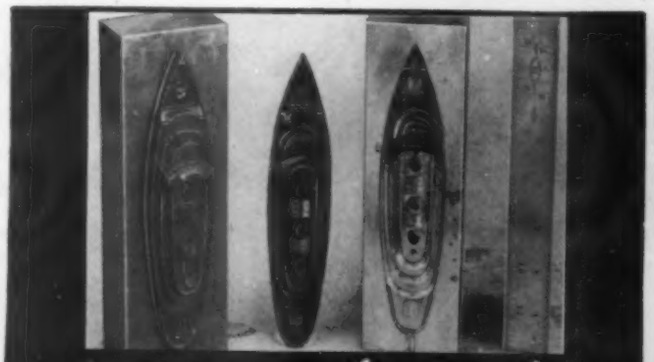
MIDWEST
HERRON & MEYER OF CHICAGO
38 South Dearborn Street
CHICAGO 3, ILL.

MILLS • PRESSES • TUBERS
EXTRUDERS • STRAINERS
WASHERS • CRACKERS
CALENDERS • REFINERS

Three outstanding features are found in EEMCO Rubber and Plastics Processing Machinery. First, Correct Design; second, Sturdy Dependability; third, Built for Heavy Duty and Long Life with minimum repairs. Mills, Crackers, Refiners and Washers are furnished as single units, or for operation "in line" of two or more.

EEMCO Presses are made from 12" x 12" for Laboratory use up to sizes to meet all requirements. The New EEMCO Laboratory Mill (illustrated) is a fully enclosed, self-contained unit with variable speed drive. Streamlined, it is ideal for Laboratory and Small Production. Bulletins sent on request. *Write today for quotations & delivery.*

EEMCO ERIE ENGINE & MFG. CO.
953 EAST 12th ST., ERIE, PENNA.



promise keeper!

NOCO TRADE MARK HOBBED CAVITIES

If your problems involve large scale production with delivery dates to meet—you'll find Hobbed Cavities a great help in keeping promises. We'll be glad to show you why *Newark* Hobbed Cavities are the choice of so many plastic molders.

For further information, please write for our brochure "The Procedure of Die Hobbing".

NEWARK DIE COMPANY, Inc.
20-24 SCOTT ST. NEWARK, N. J.
Telephone: Market 2-3772, 2-3773



It's only a Mirror... but... it's made by American

MIRRORS

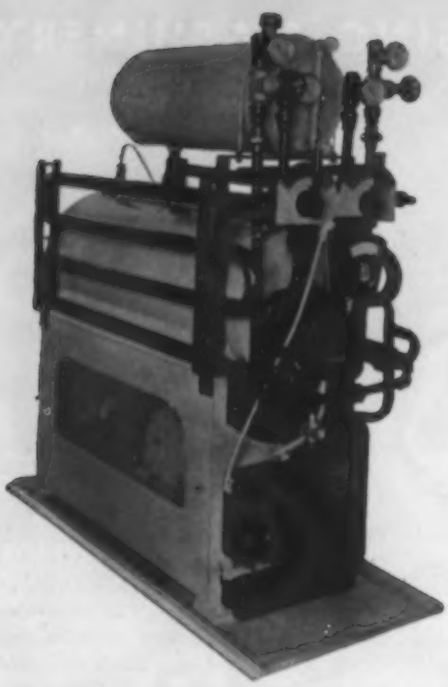
FOR PLASTIC HANDBAGS, COMPACTS, FITTED CASES, NOVELTIES

The perfect complement to a finely-finished vinyl handbag or a gleaming Lucite vanity case is a mirror made by *American*.

Made to specification, produced in quantity, *American* mirrors are of lasting quality.

We are equipped to handle export orders.

American Mirror Works
(Established 1918)
649 Broadway, New York 12, N. Y. SPring 7-1889



EXTRUDER TEMPERATURE CONTROL UNIT

- Wide temperature range available
- Sustains high or low extruding temperatures
- Supplies — or removes — heat from extruder as required
- Multiple circuits can be accommodated
- Hand-lever selection of pre-determined extruding temperatures
- Compact

JOHN ROYLE & SONS

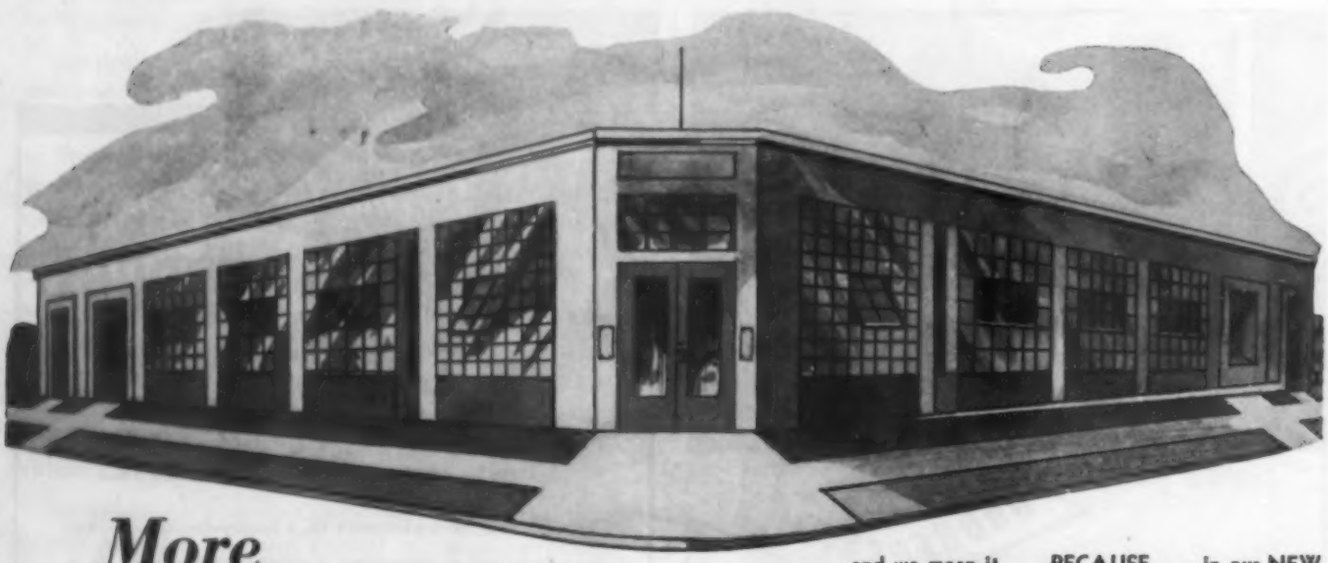
ROYLE PATERSON N. J.

Send for Bulletin #443

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN 1880

James Day (Machinery) Ltd. London, England REgent 2430 | Home Office E. B. Trout J. W. VanRiper SHerwood 2-8262 | Akron, Ohio J. C. Clinefelter JEfferson 3264 | Los Angeles, Cal. H. M. Royal, Inc. LOgan 3261

PATERSON 3, NEW JERSEY



More **ACCURATE** *Service . . .*

and we mean it . . . BECAUSE . . . in our NEW PLANT we have loads of extra elbow room . . . AND a larger staff of competent engineers and designers . . . there are a greater number of expert craftsmen . . . AND TOO there is our usual high standard of quality production . . . ALL UNDER ONE BIG ROOF. This means . . . more ACCURATE SERVICE to meet the accumulated needs of our many customers' Compression and Transfer Molding Jobs . . . AND PERHAPS . . . your problem too . . . why not call us to-day . . . NO OBLIGATION.

SOCIETY OF THE PLASTICS INDUSTRY · SPI

ACCURATE MOLDING CORPORATION

35-20 48th AVENUE LONG ISLAND CITY 1, N. Y.

Decorators and Printers



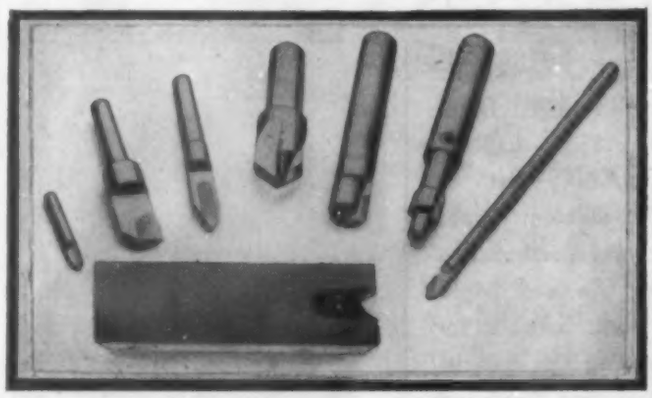
Creative **—means the finest decoration on your glass, plastic or metal container—**

Creative **—means unlimited production facilities—**

Creative **—means an expert technical staff to solve your printing problem.**

Creative **PRINTMAKERS, INC.**
200 VARICK STREET, NEW YORK 14, N.Y.
WALKER 5-6300
Surface Decorators for the Packaging Field
IN CANADA: 2424 YONGE STREET, TORONTO, ONTARIO

Molders and Fabricators:
CARBIDE-TIPPED TOOLS LAST 10-30 TIMES LONGER!



Save time and money—cut expense—build production with VELEPEC CARBIDE TIPPED TOOLS, guaranteed to last 10–30 times longer than old-fashioned steel tools. You'll save set-up time, you'll get more production and faster production from your machines. We have carbide-tipped tapered shank engraving cutters, carbide-tipped end mills, countersinks, counterbores and dovetail routing cutters. Also we make special tools to specification.

Send us your requirements for quotation.

FRED M. VELEPEC CO.
71-11 64th STREET GLENDALE, L. I., N. Y.

Skill



It takes skill and teamwork on the Basketball floor to be victorious, just as it takes skill and experience to give your product maximum quality and sales appeal. If your new or old product involves the use of custom molded plastic parts, call on Franklin, who have the experience, knowledge and know-how.

Franklin

FRANKLIN PLASTICS DIVISION
Robinson Industries, Inc. - - FRANKLIN, PA.

CATALYSTS FOR LOW PRESSURE LAMINATES AND CAST RESINS



4 UBS PEROXIDES *specifically created for polymerizing and curing of polyester type resins.*

1-HYDROXYCYCLOHEXYL HYDROPEROXIDE-1

Thermal Decomposition: 71°C
Soluble in organic solvents. Insoluble in water.
Form: White crystalline solid.
I.C.C. Classification: Oxidizing material.

60% TERTIARY BUTYL HYDROPEROXIDE

Thermal Decomposition: 89°C
Soluble in short chain aliphatics and aromatics.
Form: Water white liquid.
I.C.C. Classification: Inflammable liquid.

T-BUTYL PERBENZOATE

Thermal Decomposition: 116°C
Soluble in organic solvents. Insoluble in water.
Form: Straw colored liquid.
I.C.C. Classification: Inflammable liquid.

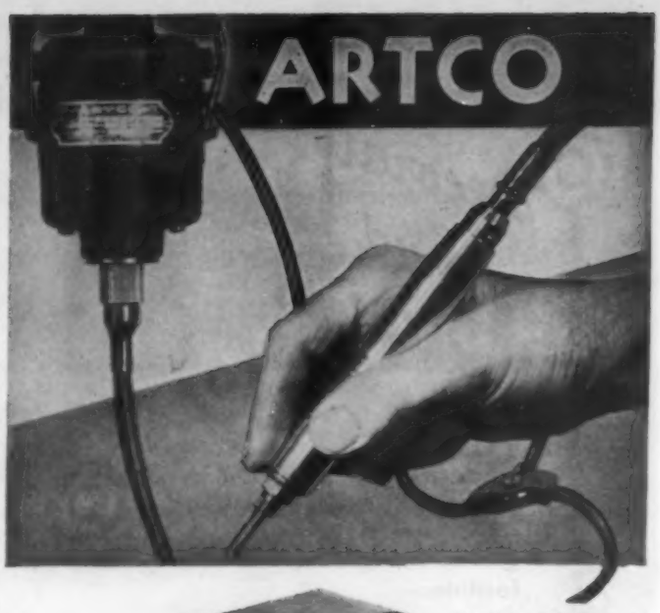
DI-TERTIARY BUTYL DIPERPHTHALATE

Thermal Decomposition: 108°C
Soluble in organic solvents. Insoluble in water.
Form: White crystalline solid.
I.C.C. Classification: Oxidizing Material.

Write for further information and Technical Data Sheets containing complete properties.

UBS

UNION BAY STATE
Chemical Company Inc.
50 HARVARD STREET, CAMBRIDGE 42, MASS.





Unit F with K handpiece. 1/5 H. P., 20,000 R. P. M. Other Models from 1/20 H. P. to 1/5 H. P. and up to 22,000 R. P. M. 8 different speeds, rheostat controlled.

FLEXIBLE-SHAFT TOOL FOR MOLD-MAKING and MAINTENANCE

ARTCO flexible shaft tools are especially designed and constructed for making molds and maintaining them.

ARTCO is the *only* tool of its kind especially designed for use in the plastics industry. As such, it is used in hundreds of plants. Send for Complete Catalog on your company letterhead.

ARTCO CARBIDE BURS on 1/8" DIA. X 1½" LONG SHANKS—Set of 12 different shapes to cover entire range of Die and Mold Work. Suitable for use on any material including hardened steel 65 Rockwell C.



AMERICAN ROTARY TOOLS COMPANY, INC.

44 WHITEHALL STREET
BOwling Green 9-4895 • NEW YORK 4, N. Y.



THE PERFECT MIRROR

That's Unbreakable!

The *perfect* mirror is not only clearer and has more reflectability than any glass mirror, but it is unbreakable too!

Why? BECAUSE IT IS MADE OF PLEXI-GLASS!

Mirro-Plex Inc. features the 5 illustrated unbreakable plastic mirrors designed to fit all standard handbag and cosmetic needs.

Mirro-Plex will also supply easy-to-cut 18 x 18 inch plastic mirror sheets in 1/16 to 1/4 inch thicknesses.

Mirro-Plex specializes in Plating on Plexi-Glass. We will plate your plexi-glass for you.

MIRRO-PLEX, INC.

160 FIFTH AVENUE, N. Y. C. • WA 9-3030

MANUFACTURERS OF THE PERFECT MIRROR



Decorators on Glass and Plastic Containers Since 1936

4 Colors in One Operation —Finest Detail

Anigraphic Process, Inc.

11 BROADWAY, NEW YORK 4, N. Y. · WHITEHALL 3-5253

THE CARVER LABORATORY PRESS



Write for latest catalog, describing Carver Laboratory Press & Standard Accessories.

FRED S. CARVER INC.

HYDRAULIC EQUIPMENT

343 HUDSON ST. NEW YORK 14



Just TUBING- but...

An European manufacturer of duplicating machinery needed special plastic tubing for an important part of his product. It had to be thick-walled, rigid and chemically inert. Because of precision machining no voids, bubbles or impurities could be tolerated. Micrometric precision and dimensional stability were also essential features.

Both Europe and the United States were thoroughly scoured to find an extruder who could meet this manufacturer's exacting requirements. After much experimenting success attended his efforts when his problem was finally submitted to Carter. The result was 2½" tubing with ¼" wall in 10 ft. lengths produced from rigid Vinylite which satisfactorily met every specification to the letter.

Whatever your tubing problem—in any thickness of wall from .002" to ¼"—in any diameter—put it up to Carter.

CARTER
PRODUCTS CORPORATION

Manufacturers of Extruded Plastics

6921 CARNEGIE AVENUE • CLEVELAND 3, OHIO

LOOKING FOR STABLE *Plastic Colors?*

Then you'll want to investigate *Ferro's inorganic colors*—ideally suited for compression and injection molded plastics. Select from full color range. Colors stable (to 2300 degrees Fahrenheit) and highly chemical-resistant. Write for further details and samples.

Color Division

FERRO ENAMEL CORPORATION

4150 East 56 Street ***Cleveland 5, Ohio***

• ACRYLICS • CELLULOSE ACETATE • POLYSTYRENE • ETHYL CELLULOSE • VINYL RESINS •

Dealers in PLASTICS SCRAP

MEYER & BROWN CORP.

Founded 1894

347 Madison Ave., New York 17, N. Y.

• ACRYLICS • CELLULOSE ACETATE • POLYSTYRENE • ETHYL CELLULOSE • VINYL RESINS •

A PACKAGE THAT APPEALS AND SELLS!



TRANSPARENT *Plastic* BOXES ... CANS

- Confections
- Cosmetics
- Bakery Products
- Jewelry
- Toys
- Plastic Novelties



Hundreds of these and other products are more readily "saleable" packed the Modern, *Transparent* Way.

Appeal to the "Impulse" buyer as well as the "Shopper." Your product will get the decision twice as often.

WEINMAN BROTHERS, INC.
Est. 1919
325 N. WELLS ST. CHICAGO 10

TINTORIAL POWER!

with

AQUA PLASTIC DYE

(Patent Pending)

Aqua Plastic Dye is available in 15 basic colors for any of 150 lovely pastel or brilliant shades. This PERMANENT dye is made as a concentrate which is instantly soluble in water.

FEATURES

- Designed especially for acrylics.
- Temperature and time requirements well within safety limit.
- Dye solution—10% concentrate, 90% water.
- Color deposits evenly.
- No danger of combustion or fire.
- Speeds production.
- Lowers dyeing costs.

Other GREAT AMERICAN products include "GAMCO", a non-burning buffing compound for plastics; ANNEALING COMPOUND which creates a bond stronger than the plastic itself; LAMINATING COLORS, tortoise shell effect, a cement with color—no air bubbles, no streaks. Also, a complete line of cold dip dyes.

New York Representative: Plastics Dye & Supply Co., Ocean Gate, N. J.

Chicago Representative: Azmo Plastics Supply Co., 823 Chicago Ave., Evanston, Illinois.

Mexico Representative: Artex Practicas, Alpes 3, Villa Obregon, D. F. Mexico.

GREAT AMERICAN COLOR COMPANY
7812 West Ninth Street
Los Angeles 6, California

Hold Parts Firmly *in Position* at Low Cost



Courtesy of Shur-Bite Inc. Bronson, Mich.

Use

DE-STA-CO TOGGLE CLAMPS *in your PLASTIC PRODUCTION OPERATIONS ...*

Here is a series of De-Sta-Co No. 210-U toggle clamps being used in the cementing of plastic fishing bait. Positive clamping pressure is assured, providing uniformity and precision workmanship on the most exacting plastic production.

The use of De-Sta-Co toggle clamps on jigs and fixtures will speed assembly operation of plastic parts and lower the cost of your fixtures themselves.

There is a De-Sta-Co toggle clamp ideally suited for all production holding operations—available from our distributors in the U. S. A. and Canada.

Send for Catalog No. 47 today

DETROIT STAMPING CO.
Established Over 30 Years
327 Midland Ave • Detroit 3, Mich.

new...

7 AND 8 INCH BORE HYDRAULIC CYLINDERS

Hannifin standard hydraulic cylinders are now available in two larger sizes, for 1500 lb. service. Design and construction parallel the standard Hannifin cylinders in 1 to 6 inch sizes. The new 7 and 8 inch cylinders are available in nine standard mounting styles with standard, large (2 to 1) or double end rods. Write for information.

HANNIFIN MANUFACTURING COMPANY
CHICAGO 24



HANNIFIN
hydraulic
CYLINDERS

26 YEARS

OF KNOW HOW

Specializing in PRECISION
COMPRESSION, TRANSFER
and INJECTION MOLDING
also High Pressure Die Casting of Zinc and Aluminum

PLASTIC & DIE CAST PRODUCTS CORP.

1010 EAST 62nd STREET • LOS ANGELES 1, CALIF.

Roy L. Peat, President — Established 1920

THE ANSWER to PLASTIC SLITTING CUTTING SHEETING PROBLEMS

CEE-BEE is the answer—we do slitting, cutting and sheeting of all materials—including cellophane, acetates, etc., from 1/16 inch to 75 inches in width.

Equipped to slit up to 100,000 yards per day, we offer prompt and reliable service. Storage space is now available; we are equipped with railroad siding.

We also interleave plastics. Bring your slitting, cutting, sheeting problems to us.

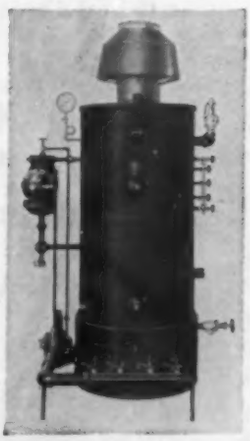
Write, phone

THE CEE-BEE MANUFACTURING COMPANY
76 NORTH 4th STREET, BROOKLYN 11, N. Y. Tel. EV 7-8331

CUSTOM-BUILT

FOR YOUR MULTIPLE

MOLDING PRESS INSTALLATIONS



That's the KANE Automatic, Gas-Fired Boiler . . . built to order for the operating pressure that you require. It's compact . . . can be placed adjacent to the presses it serves; it's economical . . . burns fuel only in proportion to the steam used; and when used in conjunction with the M-K-O Automatic Boiler Feed . . . it's self-contained, always ready to supply your STEAM requirements with minimum supervision and maintenance.

Available for individual presses is the KANE Low Water Line Automatic Gas-Fired Boiler . . . a compact, self-contained unit that requires no long pipe lines or traps; permits gravity return of condensate; and can be placed right next to the press it serves. Both types are built to A.S.M.E. specifications.

Although current demands cannot be supplied immediately, we'll try to supply your urgent needs as soon as we can.

MEARS·KANE·OFELDT INC.
1903-1915 EAST HAGERT STREET PHILADELPHIA 25, PA.
FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE

Prompt Delivery on KNOBS



ROHDEN

CARRIES ALL TYPES *In Stock*

Attractive designs in Tenite, colors walnut or ivory. Other colors special order. *Interchangeable* for flat or knurled shafts. Also set screw types available. Send for illustrated catalog.

ROHDEN MANUFACTURING CO.
1753 No. Honore St., Chicago 22, Ill.
Telephone HUMbolt 4355

The

INJECTION PROCESS OF FABRICATING THERMOPLASTICS

Is Unsurpassed

FOR SPEED PRECISION & ECONOMY

FINELINE SKRIP SET

Injection molded for W. A. Sheaffer Pen Co., Fort Madison, Iowa.

Our engineering department can design and build molds for your most intricate product. Write for information.



IMCO

INJECTION *Molding* COMPANY

3823 INDEPENDENCE AVENUE, KANSAS CITY 1, MISSOURI

FOR PERMANENT ADHESION ON PLASTIC FILM

FUSEprint *by* Velveray*

FUSEprint by *Velveray* — the quality process that was specifically engineered for plastic film — either calendered or cast. FUSEprinting assures permanent adhesion . . . for the design is welded to the film itself.

If you have a visual problem, bring it to us . . . our wide technical experience is at your disposal — without obligation.

VELVERAY CORPORATION

45 WHITE ST. • NEW YORK 13, N. Y.

610 SOUTH BROADWAY
SUITE 623
LOS ANGELES, CALIFORNIA

PLANTS: CLIFTON, N. J.
FALL RIVER, MASS.

*REG. U.S. PAT. OFF.

SYREX PLASTICS

PHENOLIC RESINS
CAST RESINS
RESINS for LAMINATIONS

CELLULOSE ACETATE MOLDING POWDERS

ETHYL CELLULOSE MOLDING POWDERS

POLYSTYRENE MOLDING POWDERS

Canadian Manufactured Products

By

SYNTHETIC RESINS LIMITED

GALT, ONT., CANADA

OPEN PRESS TIME

- *INJECTION*
- *COMPRESSION*
- *TRANSFER MOLDING*

No waiting, no delays. Our large plants stand ready to serve you. We offer a complete molding service from precision industrial products to consumer products.

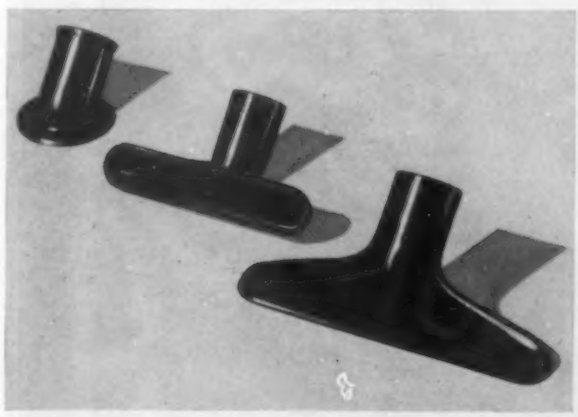
Write or call

KENNEWEG SALES & ENGINEERING CO.

155 W. Congress St. Detroit 26, Michigan
Phone CAdillac 1479

COMPRESSION AND INJECTION

Vacuum Cleaner Parts



MOLDMAKERS AND CUSTOM MOLDERS

Tooled to build efficient molds for fast economical production . . . **Experienced** in planning and delivering millions of Customolded parts . . . **Skilled** in meeting precision specifications on difficult operations. Name your Customolding requirements. Midwest will measure up.

Midwest Molding AND Manufacturing COMPANY

331 N. WHIPPLE ST. • CHICAGO 12 • PHONE: KEDzie 1057

It's Easy to see

what makes these sun glasses *a WINNER . . .*



The Special **G. M. C.** *Process**

SUN glasses are sun glasses—until you decorate them with the special G. M. C. process that deposits precious metals directly on plastics in any pattern you desire—adding new distinctive beauty. The decoration is permanent since it is integrally bonded to the sales material.

One pair of these glasses, decorated for Zylo Ware Corporation, shows an overall deposit of gold; the other pair bears a complicated silver pattern. Both are made strikingly different by the G. M. C. Process which lends new sales appeal and beauty.

Sun glasses, of course, are only one of many plastic products that we decorate. G. M. C. can give your product, whatever it may be, a novel and artistic decorative finish in any pattern or design—with any metal, precious or otherwise.

Let us show you what we can do. *Pat. Pending

G. M. C. PROCESS CORP.

Manufacturers and Decorators of Electro Deposition of Metals

46 GREAT JONES ST., NEW YORK 12, N. Y.

GRamercy 5-2313

BUT WHY THANK *Pliobond FOR NYLONS ...ISN'T THAT A GLUE?**



Please, lady! Not glue. Pliobond is a new, all-purpose industrial bonding agent that bonds anything to anything.

And it's a big help in making more nylons faster.



This is a Verge Plate. One goes into each of the 26 sections of the Full Fashioned Legger and Footer Knitting machine shown below.



Formerly, the United Knitting Machine Co., put them together with rivets and screws. Since a Verge Plate is hit by 250 steel sinkers from 70 to 80 times per minute, the vibration broke them up pretty fast. And then the machine went out of service until the Verge Plate was replaced.

Now, however, these Verge Plates are assembled by bonding a 1/8" strip of rolled brass to a 3/16" piece of "Synthane" plastic laminate. And, since the job is done by *Pliobond*, the bond withstands the terrific vibration.

• • • •

This is only one of the myriad jobs Pliobond is doing for industry today. We'll be glad to send you full details about Pliobond. Mail the coupon.

Pliobond is manufactured by The Goodyear Tire & Rubber Company, and is distributed exclusively by . . .

UNITED STATES PLYWOOD CORPORATION
TECHNICAL ADHESIVES DIVISION
55 West 44th Street, New York 18, N. Y.

Please send your free folder on Pliobond.

*Name*_____

*Street*_____

*City*_____ *Zone*____ *State*_____

M. P. 3-47

*Trademark registered, The Goodyear Tire & Rubber Co.

When in doubt
Lead Trumps



If you're confused by the vast babel of claims regarding CUSTOM MOLDED PLASTICS—you'll be playing a trump card by consulting Continental experts *first!*

Quite likely you'll save time, money and worry—to say nothing of acquiring a plastic product second to none in competitive quality and leadership.

Bring in your blueprints or a sample product for an accurate, honest appraisal of custom plastic possibilities. Or ask for a representative to call. No obligation whatsoever.

cpc

Continental
PLASTICS CORPORATION
308 WEST ERIE STREET
CHICAGO 10, ILL.

Valite*

Industrial thermosetting resins...

• • • can perform economically for YOU!

PHYSICAL PROPERTIES—LAMINATES MADE WITH VALITE RESIN No. 8123

Resin Content, Percent	High-Strength Sulphite Paper	Absorbent Kraft Paper	8-Oz. Cotton Duck	Heat-Treated Glass Fabric
Type of Lamination	48.5	40.5	48.7	39.0
Laminating Pressure, p.s.i.	Parallel	Parallel	Parallel	Cross
Moisture Absorption, 24-hr. Immersion, 1/16 Inch Thickness, Percent	250	1,000	200	75
Flexural Strength, p.s.i.	5.4	6.4	3.2	0.8
Lengthwise, Flatwise	27,100	20,550	18,800	19,500
Lengthwise, Edgewise	26,800	27,975	21,000	34,450
Tensile Strength, p.s.i. Lengthwise	28,600	24,375	13,150	48,550

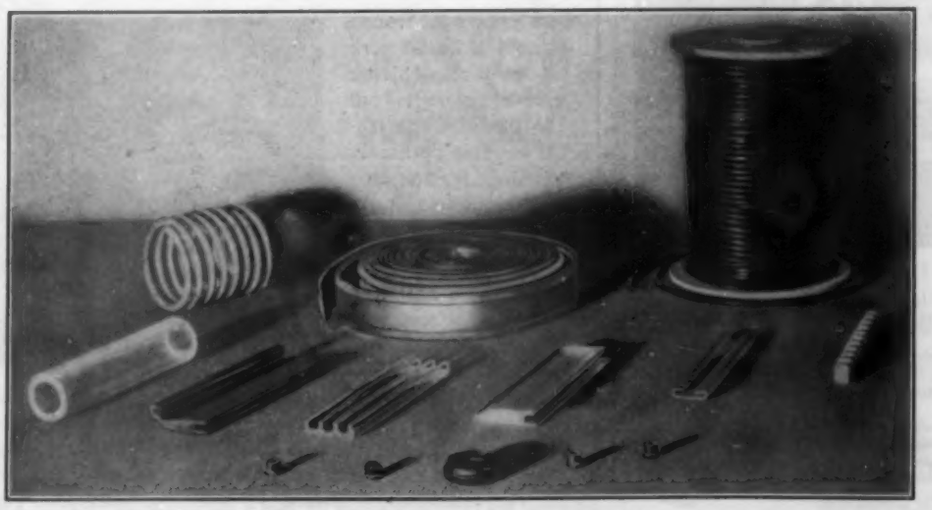
* The word "Valite" is the exclusive trademark property of Valite Corporation and application for registration of this trademark is now pending.

VALITE CORPORATION

400 WEST MADISON STREET
CHICAGO 6, ILLINOIS

Extruded ★ Molding

RODS - CHANNELS - INJECTION
STRIPS - TUBES - COMPRESSION



AVAILABLE IN:

Cellulose Acetate
Acetate Butyrate
Geon
Vinylite
Polystyrene
Methyl Methacrylate
Polythene
Phenolic
Urea
(No stock items)

AMERICAN PLASTICS CORPORATION

• • 225 WEST 34TH STREET, NEW YORK CITY 1, N. Y. • •

Plasti-chrome TURNS A NEW PAGE IN PLASTIC HISTORY!

Plasti-chrome is telling the world about MOTTLETONE—the new plastic material that is making plastic history.

It's hard to believe that MOTTLETONE is a plastic material—not onyx or marble. That's because MOTTLETONE looks like onyx—has the polished glow of marble. Actually, MOTTLETONE is an acrylic—similar to lucite and plexiglas and possessing the characteristics of cast phenolics.

What are the uses of MOTTLETONE?

This page would scarcely hold them all. We have listed a few of them here. MOTTLETONE is available in many beautiful colors—and, as its name implies, achieves a remarkable mottled effect. We say that MOTTLETONE is the plastic material of tomorrow. But here's real news. MOTTLEONE is available today, for immediate delivery. Since MOTTLETONE must really be seen to be appreciated, we suggest you write us for samples.

USES:

- RADIOS
- BUTTONS
- CLOCKS
- COMPACTS
- DECORATIVE TILING
- DESK SETS
- HAIRBRUSHES
- LAMP BASES
- TABLE TOPS
- UMBRELLA HANDLES

Plasti-chrome, inc.

EXCLUSIVE MANUFACTURERS OF Mottletone ACRYLIC SHEETS

85 FIFTH AVENUE • PATERSON 4, N. J. • LAMBERT 3-5883



HERE'S ONE FOR THE RECORD...

HIGH FLOW AT HIGH PRESSURE WITH . . .

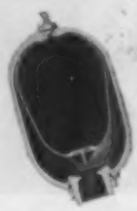
GREER HYDRAULIC ACCUMULATORS

The tonal quality of a phonograph record depends upon the production method and materials used. And, one way to assure records which will bring repeat sales is to equip your record press with a Greer High-Flow, High-Pressure Accumulator.

Smooth flow and precisely controlled hydraulic power at the flick of a lever saves time and materials and eliminates those costly rejects. Results obtained by the above installation prove this point.

In countless other applications in practically every variety of industrial processes, Greer Accumulators are increasing the efficiency and dependability of production tools, and machines.

Get the complete story now! Write for bulletin "Accumulators for Industry".



GREER HYDRAULICS Inc.
454 EIGHTEENTH STREET, BROOKLYN 15, N. Y.

Something New in PLASTIC DRYING OVENS



This shows a Trenco Model No. 270 at work preconditioning plastic material before it is put into the injection machine. This particular machine is handling the requirements of three 8-ounce injection machines.

TRENCO—a new firm composed of men with 20 years' experience in the plastics machinery and press business are experts in the designing and building of plastics equipment. There are two sizes to choose from, No. 270 with 14 drawers and No. 271 with 7 drawers. With or without thermostatic control and attractively priced. Delivery takes from 2–3 weeks.

TRENCO, INCORPORATED

110 Whitney Avenue New Haven, Conn.

Special types have been developed for each plastic

Pearl Essence

THE
MEARL
CORPORATION
163 Waverly Place New York, N.Y.

MODELS
OR
MOLDS
FOR PLASTICS PRODUCTION
PRE-MOLD PLASTIC MODELS
Transparent
3-DIMENSIONAL MODELS
INJECTION AND
COMPRESSION MOLDS

STRICKER BRUNHUBER CO.
Mechanical Developers
19 WEST 24th ST. NEW YORK 10, N. Y.
WAtkins 9-0191

ATKINS

"Curled-Chip"
BUTTRESS BAND SAWS



Superior Plastic Sawing



On every count—speed, smoothness, versatility, economy—you can count on Atkins Curled-Chip Band Saws for superior plastic cutting.

FAST



These unbeatable blades with the unique "Skip Tooth" design bite right into toughest plastics . . . cut cleaner, cooler, longer.

SMOOTH



You'll have less finishing to do on plastics cut by the exclusive Curled-Chip method . . . the cut is uniformly glossier and finer.

VERSITILE



Profile, contour, curved or cut-off sawing—it's all the same to this remarkable blade . . . it performs with equal efficiency on the most unusual jobs.

LOW-COST



You'll save both time and money by standardizing on Atkins Curled-Chip Buttress Bands . . . through increased production, fewer blade changes, faster finishing, lower scrap losses.

Consider *your* special requirements—then consider Atkins special advantages—they'll "measure up". Write for complete data *today*.

ATKINS
E. C. ATKINS AND COMPANY
402 South Illinois Street
Indianapolis 9, Indiana
Agents and Dealers in all Principal Cities the World Over



Do you have a molding press problem?

Look to PEDLOW for The Quick, Practical Solution

You can depend upon Pedlow's modern standard hydraulic presses of 50 to 300-ton capacity—and *special machinery designed and built to your individual requirements*—for efficient, economical, trouble-free molding operations. For "on time" deliveries of rugged, accurate presses—such as we've made for Bakelite, Du Pont, Electric Auto-Lite, Tri-United Plastics and other leaders—you're wise to look to PEDLOW.

Press Illustrated—50-ton hydraulic for compression or plunger molding.

AT YOUR SERVICE... trained engineers to help solve your molding machine problems—no matter how diversified or difficult they may be! Write today for the expert assistance of "the Pedlow man."

Note: Some territories open for reputable sales agents.

PEDLOW MACHINE COMPANY
Founded 1918
Hydraulic & Special Machinery
FRONT & BROOMALL STS., CHESTER, PA.

MISKELLA INFRA-RED OVENS and APPLIANCES SERVE THE PLASTIC INDUSTRY

STEAM-VEYOR (*Thermosetting*)

- Ready for delivery April 1, 1947

A combination oven for preheating compression preforms using steam and infra-red heat in place of induction and electronic methods. See complete story on sensational new process in February 1947 MODERN PLASTICS by Moxness of Minneapolis-Honeywell Regulator Company.

INJECTO-VEYOR (*Thermoplastic*)

- Ready for delivery May 1, 1947

An attachment for an injection molding machine hopper for automatically drying and preheating plastic powder. Small, compact, easy to clean. Highly insulated. Very practical. Easy to mount without special brackets.

VIBRA-VEYOR (*Thermoplastic*)

- Now carried in stock for immediate delivery

For seven years the plastic industry standard for automatically drying and preheating plastic powder granule by granule.

THE MISKELLA *infra-red* COMPANY

DESIGNERS—MANUFACTURERS OF
INFRA-RED OVENS • APPLIANCES • SECTIONAL UNITS • MACHINES AND CONVEYORS
Main Offices and Laboratory
East 73rd and Grand Ave., Cleveland 4, Ohio

SPEED-PRINTZ

Gold Stamping Machine

the name tells the story

STAMPS NAMES, INITIALS, TRADE-MARKS

on plastic items.

Send Samples of Plastic for further Information



Immediate delivery

WILSON GOLD STAMPING MACHINE COMPANY
1855 HILLHURST AVE., HOLLYWOOD 27, CAL.

For Future Reference

M. N. Martindell

When you find a Plastic Molding Organization which combines the experience of an individual's lifetime with the equipment and skill you expect to find in the most modern plant, then you have discovered a most valuable ally for the efficient and economical development of your product.

Such an organization does exist. Note the name NOW for future reference.

MARTINDELL MOLDING CO.

OLDEN and 6th Street - TRENTON, NEW JERSEY

A New

HYDRAULIC HOBBING PRESS

COMPLETELY SELF-CONTAINED WITH PUMP AND MOTOR



• Something new in hydraulic hobbing presses is this compact and rugged M & N press. Modernly designed and built to do perfect hobbing jobs, the M & N press is also readily adaptable for blanking, forming and drawing of heavy materials and for compression experimental work on plastics and rubber. It requires a minimum of floor space and features a constant pressure control. M & N presses are available in an unusually wide range of pressures—from 30 to 400 tons.

IMMEDIATE DELIVERY

Write for complete specifications today.

M & N MACHINE TOOL WORKS

161 ORONO STREET CLIFTON, N. J.

Representative: West Coast Plastic Distributors Co.,
1400 E. Adams Blvd., Los Angeles, Calif.

SOLVED

AMERICAN PLASTICS ENGINEERING CORP. DETROIT

Molding Projects of All Types

Our staff of experienced plastics molding technicians guides your project through from the seed of an idea to the finished product.

The Steps:

- Styling and Designing
- Model Making
- Mold Building
- Facilities Layout
- Operations Controls
- Heatronics
- Molding and Finishing Problems

CALL OR WRITE WITHOUT OBLIGATION

AMERICAN PLASTICS ENGINEERING CORPORATION

3020 East Grand Blvd. Detroit 2, Michigan

Cumberland Plastics Granulating Machines





Expressly designed for granulating the various types of plastic materials

Advanced design features enable Cumberland machines to perform at maximum efficiency the special cutting required by plastics materials. Machines are made in two styles: smaller machines No. O, No. ½ and No. 1½ as at right (No. ½ illustrated). Style of large machines as at left with retractable knife block for maximum accessibility (18" Machine illustrated).



Request illustrated CATALOG No. 200





CUMBERLAND ENGINEERING CO.
Dept. A—Box 216, Providence, R. I.

S·S·White PLASTIC CAP SCREWS



HEX, SOCKET HEAD TYPE WITH OR WITHOUT NUTS

Used, both with and without nuts, for assembly work and for mounting instruments and other elements on panels—particularly in the electrical field to avoid metal screws affecting instruments, etc. Regularly molded in Black Acetate thermoplastic only.

Part No. 1604-303 — Cap Screw only—Threads, ¼"-20 —Thread length, ¾"—Overall length, 1"

Part No. 1604-304 — Hex. Nut only — for ¼"-20 cap screw — Across flats, ½" — Thickness, ¼"

Samples and prices mailed on request.

S.S.WHITE PLASTICS DIVISION
THE S. S. WHITE DENTAL MFG. CO.
DEPT. M, 10 EAST 40th ST., NEW YORK 16, N. Y.

if you manufacture toys or housewares

here's a complete marketing and merchandising service that's tailormade to fit your needs!

1. We will merchandise your products for you.
2. We will work on a royalty basis.
3. We will buy your output.

Write or wire to-day for full details on how this new service works for you.

UNIVERSAL PLASTICS CORPORATION

10 Years of plastic molding experience

Merchandising Subsidiaries: Tot Tested Toys Ltd. • Jiggs Penny Corp. (housewares) Patricia Page (cosmetic containers)

270 Madison Avenue • New York 16, N. Y

Plastic Markings
in gold, silver or colors

THE KINGSLEY hot stamping machine is precision-built to produce clean-cut stampings of designs, names and trademarks on soft plastics and other similar materials.

Production speeds up to 800 per hour using unskilled operators.

Send samples and details of your stamping problems.



EASY TO OPERATE

Kingsley STAMPING MACHINE CO.
HOLLYWOOD 28, CALIFORNIA

PLASTIC MOLDS

25 years experience in designing and building molds for leading molders.

Our plant is modern in equipment for producing the best in molds.

Compression • Injection • Transfer

Now equipped with an eight-ounce injection machine for testing molds!

SOCIETY OF THE PLASTICS INDUSTRY · SPI

FORTNEY MFG. CO.
INCORPORATED
247 N. J. R. R. Ave. Newark 5, N. J.

Rayco Fillers



WORKING SAMPLE FREE

Rayon Processing Co. of R. I., Inc.

PIONEER PRODUCERS OF
COTTON FILLERS FOR PLASTICS

60 TREMONT ST. CENTRAL FALLS, RHODE ISLAND

WANTED TO BUY · PHENOLIC IMPREGNATED FABRIC SCRAP · RAGS OR REMNANTS

FINDINGS WHAT YOU NEED WHEN YOU NEED IT!

Suppliers for Molders and Fabricators
of
Jewelry
Compacts
Handbags
Luggage
and Dress
Accessories
(Millinery, Shoes, Belts)

WE are known for the wide variety of our line of metal and plastic findings. We have a large assortment of Metal Stampings, Ornaments (including Filigree), Charms, Bead Chain, Buckles, Fancy Wire, Wire Formings, Hinges, Plastic and Metal Beads, Fancy Chain, etc., for every kind of trimming, novelty and decorative use.

Address Dept. G-3



The SPEEDRIVER



An indispensable tool for fabricators of Plastics, Celluloid, Brass, Iron, etc.

Magnetic tip holds drive screw in place for driving. Hardened steel spring action drives it in. Adjustable for light or heavy drive—will not break plastic material while driving the screw.

Durable—Long Lasting—A time and labor saver—Use it once and you will not want to get along without it.

Send for folder.



MARTIN M. STEKERT
45 WEST 34th ST., NEW YORK 1, N. Y.



ONE HEIN-WERNER . . . . . SELLS ANOTHER

One Hein-Werner Hydraulic Jack leads to the purchase of another when industrial users discover the convenience, dependability and versatility of these powerful, easy-operating jacks.

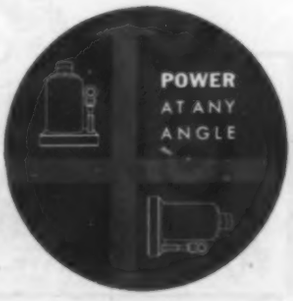
In a thousand and one applications—lifting, moving, bending, pressing . . . in plant production and plant maintenance, the H-W Hydraulic quickly proves its efficient ability. Every Hein-Werner Jack is factory-tested at 1½ times its rated capacity for absolute dependability and safety.

Let an H-W Hydraulic prove its ability to handle any number of tough jobs in *your* plant. Once you've tried one you'll order more. Made in models of 1½, 3, 5, 8, 12, 20, 30, 50 and 100 tons capacity. See your nearest industrial supply distributor, or write us for details.

HEIN-WERNER MOTOR PARTS CORP.
WAUKESHA, WISCONSIN

IT'S *MORE* THAN A LIFT!

It is versatility in hydraulic power. It lifts, moves, bends, presses at *any* angle for any job—from vertical to horizontal. The H-W Hydraulic *always* delivers maximum power.





"...for better plastics products"

YES, SIR! THEY'LL WORK IN PERFECT HARMONY WITH *YOUR* PLASTICS PRODUCTION.

WHATEVER YOU MAKE, THEY'LL HELP YOU MAKE IT—BETTER, FASTER AND CHEAPER!

•

REZ~N~DYE

A quick dip *permanently* colors most plastics. No heat, no mixing, no fuss! 21 colors.

$3.30 per gallon F.O.B. Factory

REZ~N~GLUE

Sticks anything to everything—*and how!* Colorless and transparent. Dries in 1 to 2 minutes.

$5.50 per gallon F.O.B. Factory

•

REZ~N~KLEEN

Instantly removes masking tape and all other foreign matter from Lucite or Plexiglas.

$1.65 per gallon F.O.B. Factory

REZ~N~BOND

Special bonding agent for Lucite and Plexiglas. Produces invisible junctions—*stronger* than the parts joined!

$4.50 per gallon F.O.B. Factory

SCHWARTZ CHEMICAL CO., Inc.
326-328 WEST 70th ST. • NEW YORK 23, N. Y.
Tel.: Schuyler 4-2126

COMPLETE PLANTS

for

Transparent Wrappings

Film Casting Coatings

Solvent Recovery

FRENKEL'S MACHINES (FOREIGN) LTD

329 HIGH HOLBORN, LONDON, W.C.1



MORE THAN LIP SERVICE!

No matter what we mold at Ideal — lipsticks or thimbles or buckles or buttons, we give more than lip service to the word "quality." With us "quality" is no intangible; it is attention to detail which makes each piece a little gem of accurate, clean, sharp molding. That's why so many manufacturers call on us for answers to their molding problems.

We'd like to discuss your molding problems. Ask for Al Manovill!

MAIN OFFICE AND FACTORY
23-10 — 43rd AVENUE
Long Island City 1, N. Y.

IDEAL PLASTICS CORP.

CHICAGO REPRESENTATIVE
STEEL MILL PRODUCTS CO
176 W Adams St Chicago III



PLASTIC MOLDS DIES · HOBS

Produced for Admiral Corporation and "Chen-Yu"

"BUILT BY DANIELS-KUMMER"

. . . That is a statement that has won respectful attention for many years. All the varied techniques, skilled artistic craftsmanship, equipment and know how of this seasoned organization is available to YOU.

ENGINEERING • MOLD DESIGNING AND BUILDING • ENGRAVING

DANIELS-KUMMER ENGRAVING CO.

180 NORTH WACKER DRIVE • CHICAGO 6

KRASILOVSKY BROS. TRUCKING CORP.

Master Riggers and Heavy Haulers

AUTHORIZED ICC PSC

Specialists in handling plastics machinery

From assembly line to floor of your plant.

SKILLED • EXPERIENCED • INSURED

5 Corlears Street New York, N. Y.

GRamercy 5-7850

What's in a Name?



According to Shakespeare a name didn't mean much—which was very likely true in his day. Today, though, when a high pressure reducing valve is marked ATLAS—or when *any* regulating valve for *any* service is marked ATLAS, it means that it is the best and most dependable regulating valve obtainable.

So when, in your plastics plant, you want to reduce a pressure from, say 6,000 psi *without shock*—water, oil, or air—specify the valve shown at the left which is our

ATLAS Type "E"

High Pressure Reducing Valve

We receive repeat orders for this remarkable valve day after day from leading plastics plants the world over.

They Order Repeatedly Because:

ATLAS Type "E" is highly satisfactory. It is built by a concern that has made regulating valves exclusively for nearly a half century. The body of this valve, for example, is entirely of forged steel. All internal metal parts are wholly of stainless steel. A formed packing of special material superior to leather is used which is immune to all fluids commonly used in hydraulic machinery. The pressure on the seat is balanced by a piston with the result that variations in high initial pressure have little effect on the reduced pressure. Ask for complete information.

For other ATLAS plastics plant products see the partial list in our ad in the January 1947 issue of MODERN PLASTICS

ATLAS VALVE COMPANY

REGULATING VALVES FOR EVERY SERVICE

277 South Street, Newark 5, N. J.

Representatives in Principal Cities

Attention

MANUFACTURERS—FABRICATORS!

Special Offering

3/16 inch PLEXIGLAS SHEETS

UNMASKED • FLATTENED • GOOD CONDITION

Minimum size 12 inches by 24 inches

65 cents per pound

250 pounds or over—60 cents per pound

all prices F.O.B. Detroit

DISTRIBUTORS OF SCHWARTZ CHEMICAL

Rez-N-Bond, Rez-N-Glue, Rez-N-Dye

HOUSE OF PLASTICS are known as distributors of the finest plastics . . . suppliers of America's leading manufacturers and fabricators.

Write or wire our Wholesale Dept. for Price and Quantity Lists

HOUSE OF PLASTICS SERVICE HP

HOUSE OF PLASTICS, INC.

7604 Fenkell Avenue UNiversity 3-8744 Detroit 21, Michigan

It Costs You Less To Pay a Little More For **SILLCOCKS-MILLER PLASTIC NAME PLATES**



The nameplate that identifies your product should reflect the quality you build into it.

Recognizing this, manufacturers all over the country have made Sillcocks-Miller their source of nameplates fabricated of plastic. These companies know that quality is a tradition here at Sillcocks-Miller . . . that every job must conform to our rigid standards of accuracy and perfection.

From long experience, our engineers can readily meet your nameplate requirements. There is no lost motion, no delays to you because of "trial and error" production.

That's what we mean when we say it costs you less to pay a little more for Sillcocks-Miller quality.

Write for complete details.

THE SILLCOCKS-MILLER CO.

10 West Parker Avenue, Maplewood, N. J.
Mailing Address: South Orange, N. J.

SPECIALISTS IN HIGH QUALITY, PRECISION-MADE PLASTICS FABRICATED FOR COMMERCIAL, TECHNICAL AND INDUSTRIAL REQUIREMENTS.

All classified advertising payable in advance of publication. Minimum, $5.00 (up to 60 words); in border, $10.00 per inch

Classified Advertisements

For further information address *Classified Advertising Dept.* MODERN PLASTICS 122 East 42nd St., New York 17, N. Y.

HAVE AVAILABLE time for compounding vinyl resins on Banbury, mill and calender equipment. Also granulating equipment.
Address replies to:

Mr. A. V. Lynas
% Sav-Way Industries, Inc.
Box 117—Harper Station
Detroit 13, Michigan

AGENTS WANTED by Plastics Manufacturer. Advertising and display manufacturer with complete laminating, fabricating and moulding facilities desires representative outside New York City. Commission basis. State Lines You Are Handling Now. Ranger-Tennere, Inc., 430 West 31st St., N. Y. 1, N. Y.

AUSTRALIAN MARKET—The only organization specializing in Distribution in the Plastics field. Complete permanent cover. Virile representation. Sole rights of Patented or proprietary lines preferred, but salable lines accepted. All materials, machinery, manufactured products, woven materials and films particularly. Send full details and Samples (if possible) to Dussi-Wallace & Company, Lincoln Building, 60 East 42nd St., New York 17, N. Y., in association with National Plastics Trading Company, 25 Carlisle St., Ashfield, Sydney, Australia.

OPENING FOR MECHANICAL ENGINEER qualified for designing a general line of rubber and plastic working machinery.

National Erie Corporation
Erie, Pennsylvania

FOR SALE—1—12" x 12" Press 7" Ram, Steel Heated Platens and Hand Pump attached; 1—24" x 24" Adamson, 10" ram, 2-opening Hydraulic Press; 1—24" x 24" Farrell, 10" ram, 2-opening Hydraulic Press; 1—30" x 30" D&B, 2-open, steel heated Platens 12" ram; 2—La Pointe Hydraulic Pumps, 130 G.P.M.—3000 lb. pressure direct motor driven to 125 HP AC motors; 1—French Oil Hydropneumatic Accumulator; 1—14" x 24" Press, 9" ram; 6—Hydraulic Presses, 20" x 20", 12" x 14"; Dry Powder Mixers; Pulverizers, Grinders, etc. Send for complete list. Reply Box 1345, Modern Plastics.

DO YOU NEED a Hydraulic Press for Compression Molding, Transfer Molding, Laminating, Forming, Bending and Hobbing? Whatever it may be, if it is hydraulic, see Sal-Press Company, 388 Warren Street, Brooklyn, N. Y.

MOLDERS!
I can provide large, patented, low cost hydraulic presses to inject from 2 pounds to 20 pounds per shot. Machines mold thermosets, thermoplastics, rubber, the light metals, etc.
G. W. Wacker
4762 Reading Road, Cincinnati 29, Ohio

FOR SALE: Angle Molding Hydraulic Press Watson-Stillman, suitable for Split Molds, and for Molding Complicated Parts by the transfer method. 3 horizontal double acting rams, 13½", 8" and 6" arranged in "T". Reply Box C132, Modern Plastics.

WANTED: PLASTIC SCRAP OR REJECTS in any form. Cellulose Acetate, Butyrate, Polystyrene, Acrylic, Vinyl Resin, etc. Also wanted surplus lots of phenolic and urea molding materials. Custom grinding and magnetizing. Reply Box 318, Modern Plastics.

HYDRAULIC PUMPS
Aldridge Pump Co. Vertical Triplex HYDRAULIC PUMPS, 2¼" x 8", equipped with Herringbone Gears, 67.5 gpm. Maximum pressure for intermittent duty 2,200 lbs., for continuous duty 1,800 lbs. Pump and motor mounted on common bed plate. Motors are 75 HP, 3/60/220-440 volts, 740 RPM. Complete with starting panel, consisting of G.E. motorstarter switch, push button control, square "D" Switch, and capacitator.
Purchased new 3½ years ago. Excellent condition. Available for immediate delivery. Reply Box C268 Modern Plastics.

WANTED: THERMOPLASTIC SCRAP or rejects in any form, including Acetate, Butyrate, Styrene, Ethyl Cellulose, Acrylic and Vinyl Resin material. Submit samples and details of quantities, grades and color for our quotations. Reply Box 508, Modern Plastics.

AVAILABLE—Executive, with extensive experience in the engineering and manufacture of plastics, metal, and wood parts and assemblies, desires position as General Manager or equivalent, where his qualifications will be utilized to their utmost. Has been associated with the plastic industry for the past eight years and has had 20 years experience in supervisory and executive positions. Reply Box C267, Modern Plastics.

CASH PAID
For Capital Stock or Assets of Industrial Enterprise
WANTED—By large financially powerful diversified organization wishing to add another enterprise to present holdings. Existing Personnel Normally Retained. Strictly confidential. Box 1230, 1474 B'way.

FOR SALE: (1) Watson-Stillman Angle Press, 25 ton each cylinder, $500. (4) Hydraulic presses, 22 x 36, 400 ton capacity 16" ram, 24" stroke, 5' daylight. Price is $1800 each. (1) Watson-Stillman Weighted Type Accumulator $1200. These presses are located at Sal's Press, 386-90 Warren Street, Brooklyn, New York. Delivery is f. o. b. Brooklyn, N. Y. All offers are made subject to prior sale.

COLORIST WANTED: By nationally known manufacturer entering plastics field; plant located in middle Atlantic area. Man with experience in the coloring of Thermoplastics. Should be able to develop full line of colors. Knowledge of physical testing desirable but not essential. Supply full particulars including training and experience, and state salary expected. Reply Box C269, Modern Plastics.

Wanted
Clean Vinyl Scrap
Preferably *Clear* Types.
Also—Virgin Material, Plasticizers. Submit offer to Box C270, Modern Plastics.

FOR SALE
25 Ton "C" Frame Type High Speed Self Contained Hyd. Press.—300 ton New Hobbing Press with Pump—Racine Pumps, Boosters, Valves, Logan Pumps, Valves.—250 Ton Farquhar Straightening Press, Bed 32" Wide, 22' Long. Self Contained.—200 H.P. 78 Gal. 3000# Pump 200 H.P. 200 Gal. 1500# Pump, 18' x 15' Accumulator 1500#.—15' x 11' Acc. 400-2000#.—6' x 9' Accumulator-2000#. 300 Ton Press 20" Ram, 8" Stroke, 24' x 20' Platen. 500 Ton—1000 Ton Hobbing Press.—Hele Shaw Variable Pressure 33 GPM 2500#.—Vickers Oil Pumps 17 GPM 500 to 1000#. Elmes Horo. 4 Plunger 6½ Gals. 5000#.—Stillman 12 x 12" Laboratory Presses. Hydro Penumatic Accumulator, 42" Air Cyl. 48" Stroke. Aaron Machinery Co., 45 Crosby St., NYC.

Sales representative for large midwestern Plastics fabricator to obtain contract and industrial jobs. Prefer men now selling custom molded plastics and who have a following with industrial users. Regal Plastic Company, 710 Main, Kansas City 6, Mo.

Wanted to buy: PLASTIC EXTRUDER. HILLEL PLASTICS, 575 Eighth Ave., New York 18, N. Y.

Executive chemical engineer with 18 years industrial experience in compounding of all thermoplastics and polymerization of styrene and acrylics desires connection as consultant on research, development and production of molding plastics. Reply Box C284, Modern Plastics.

IN THE MARKET FOR: Stainless Steel or Nickel Kettles, Vacuum Pan, Preform Machine and Mixer, Hydraulic Presses. Reply Box 825, Modern Plastics.

FOR SALE: F. J. Stokes Automatic Molding Machines: 1—model 202A-2 15-ton with 5 hp. motor; 1—model 202A-2 20-ton with 7½ hp. motor; two model 200D-2 15-ton with 5 hp. motors. In excellent condition, ready for immediate delivery. Loeb Equipment Supply Co., 910 No. Marshfield Ave., Chicago 22.

Available:—A Mechanical Engineer wishes to connect with a going compression plastic manufacturing concern as plant engineer or master mechanic having full supervision over plant equipment, engineering, designing, machine shop and tool room depts. Have had a number of years experience and willing to locate anywhere. Reply Box C271, Modern Plastics.

Vinyl wire insulation to your specification. Large quantity for sale. Also polystyrene molding powders. Attractive price. Offered subject to prior sale. Stamford Plastic Compounds, Inc., 69 Sunnyside Avenue, Stamford, Conn.

ATTENTION MOLDERS
PRODUCTION DIES AND PATENTS of a nationally advertised and accepted product for sale by owner. Patents cover other products with real sales potential. Reply Box C272 Modern Plastics.

For Sale: 50,000 Vinylite Strips ⅛" x 24½", .040 to .060 thick. Art Plastic Mfg. Co., 2015 E. 100 St., Cleveland, Ohio.

BLOW MOLDERS
If you can blow mold polyethylene bottles of special shapes, please ask for blueprints and specifications from, The Murdochs, 1659 Willowhurst Ave., San Jose, Calif.

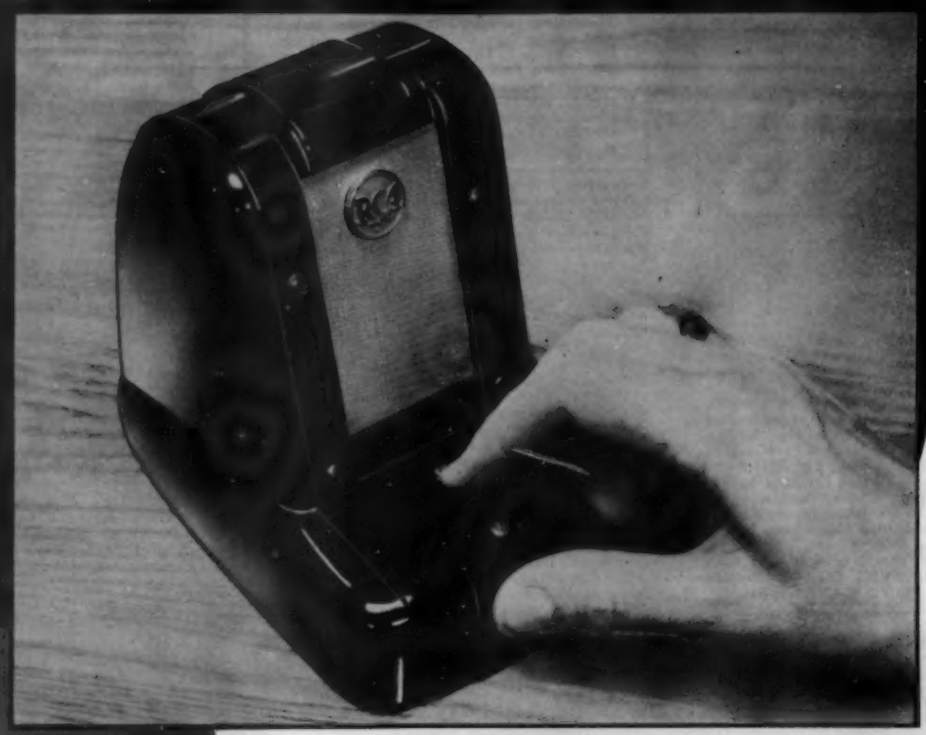
FOR SALE: 8—Southwark Triplex Hydraulic Pumps in first class condition, 3¼" Bore, 12" Stroke, 1500# working pressure, 100 U. S. gal. per minute capacity, complete with forced feed lubricator, coupling, reduction gear, hydraulic pilot valve and by-pass valve. (Can be converted to suit any pressure required). Reply Box C273, Modern Plastics.

PLASTIC CHEMIST, college degree, 31, married, American Chemical Society membership, veteran, 46 month chemical warfare, Special training and study in plastic field at Columbia University, Plastic Technical Institute. Some experience in production field. Desires position with advancement, opportunity in plastic industries or material manufacture field-production, development, research. Employed now, but seeking change. Available short notice, location immaterial. Reply Box C274, Modern Plastics.

Wanted Sales-minded Plastics Designer to develop molded plastic articles that will sell. Must have imagination, and good knowledge of plastic materials and markets. Good opportunity with well established manufacturer. Give complete history and salary wanted, in confidence. Reply Box C275, Modern Plastics.

Wanted Plastics Sales Manager thoroughly familiar with distribution of molded plastic articles, to develop markets for established manufacturer with good and growing line of proprietary articles in housewares and related fields. Reply Box C276, Modern Plastics.

PLASTICS for INDUSTRY



CREATIVE CUSTOM MOLDING

Plastic housing for an inter-office communication unit produced by CRUVER.

CRUVER CHICAGO

51st Year in Plastics . .

Cruver

MANUFACTURING COMPANY

2456 W. Jackson Blvd., Chicago, Ill., Seeley 1300

New York – 2 W. 46th St. • Wisconsin 7-8847

PATENT FOR SALE: Automobile Sun Visor. Completely protects driver against direct sunlight and glare, from front or sides, without frequent adjustments. Nothing like it. Patent will dominate anything similar to it. Cash, royalty or license basis. Inquiries invited from substantial manufacturers only. Andrew R. Sutton, 1931 General Taylor St., New Orleans, La.

CUMBERLAND No. 1½ PLASTIC GRANULATING MACHINE FOR SALE. Machine has high base, 15 H.P. 1200 RPM, 220/440 volt 3 phase, 60 cycle motor, flexible coupling, magnetic starter, remote push button. Never used. Immediate delivery. Box C280, Modern Plastics.

ASSISTANT SUPERINTENDENT and FOREMEN WANTED

Experienced on Reed Prentice Injection Molding Machines. Established Western New York Molder. Reply Box C281, Modern Plastics.

FOR SALE: HPM 500 ton Mold. Presses 42" x 48"; D. & B. 500 ton 42" x 48"; Adamson 400 ton 27" x 24"; 20" x 20"; also 20 to 250 Tons from 36" x 36" to 12" x 12"; Farrel 6" x 13", 10" x 20", 14" x 30" and 16" x 48", 2 Roll Rubber Mills; Stokes 1 ⅞" dia. Rotary Preform Tablet Presses; 40 Ton Broaching Press; 400 Ton Extrus. Pr.; W. S. Hor. 4 Plgr. 1" x 2" x 4" H. & L. Pressure Pumps; HPM 1¾" x 6" Vert. Triplex 10 GPM 2700 lbs.; 7 Hydr. Oil Pumps, Vickers, Oilgear, Northern, etc.; Elmes 1" x 4" and 1½ x 4" hor. 4 plgr. 5 to 8 GPM 4500 lbs. and 5500 lbs.; Rumsey 4½" x 8" vert. triplex, 65 GPM 900 lbs.; Elmes 2½" x 4" hor. 2 plgr., 17 GPM 850 lbs.; 10 HP horiz. 1½" x 4" triplex 6 GPM 3000 lbs.; New Vickers 1¼" Oil Relief Valves; New Vickers ¾" Flow Control Valves; Hydr. Steam Pumps; Hand Pumps; Low Pressure Pumps 150 to 600 lbs.; Hydr. Accum. Heavy Duty Mixers; Roller Conveyor, Grinders, Pulverizers, Gas Boilers, etc. PARTIAL LISTING. WE BUY YOUR USED MACHINERY. STEIN EQUIPMENT CO., 426 Broome St., NEW YORK 13, N. Y. CANAL 6-8147.

FOR SALE

Adamson 12" x 24" Plastic & Rubber Mill, Self Contained, equipped with 25 H.P. Motor and Controls, Flood Lubrication System, etc. Most Modern Type. Brand New. Box C277, Modern Plastics.

SCANDINAVIA

Old and well-known firm which has recently established a special plastic department wants to contact: Manufacturers, Consulting Engineers, Research Laboratories, who are engaged in the plastic industry. We are interested in: Manufacturing Licenses, Patents, Processes, etc.
Moulding powder, sheets, rods, tubes and resins for: cold moulding, gluing, laminating, impregnation, coating, etc. Finished products of specific nature. Our plastic engineer will visit the U.S.A. this spring and he will be pleased to negotiate with you. SCANDENS, 17-19 Ostergade, Copenhagen K., Denmark.

Executive: Not a swivel chair man, but one with the know how and why of Molds and Molding of all types. Have specialized in design and building of molds and equipment for mass production for last twenty years. Age 50. Located in Ohio would prefer East or South. Desires permanent position rather than high salary. Reply Box C278, Modern Plastics.

For Sale: Dielectric Megatherm Heating Unit, type MD-3-C, 3 Kw output 220 V., 2 or 3 phase, 60c manufactured by Federal Telephone & Telegraph Co. Can be used as preheating unit for preforms. Equipment complete with tubes, practically new. Any reasonable offer considered. Write Box C286, Modern Plastics.

Large Injection and extrusion molder located New York City interested in establishing commission representatives for custom industrial molded parts. Territories: Philadelphia, New England, upper New York State. Reply Box C283, Modern Plastics.

Wanted—Representative to sell custom molding work, injection molding and fabricating. Straight commission basis. Reply Box C288, Modern Plastics.

Rotary Embossing Machine for sale. Ideal for embossing extruded plastics. Price $350.00 complete with engraved roll. Photo on request. Robert J. Golka Co., 400 Warren Avenue, Brockton, Mass.

SALES ENGINEER WANTED INJECTION MOLDED PLASTICS

Should be graduate of engineering college, preferably with experience selling custom injection molded plastics in N. Y. area; to open N. Y. sales office. Excellent opportunity with well established N. Y. State molder. Give complete personal history, plastics experience and record of earnings. Reply Box C282, Modern Plastics.

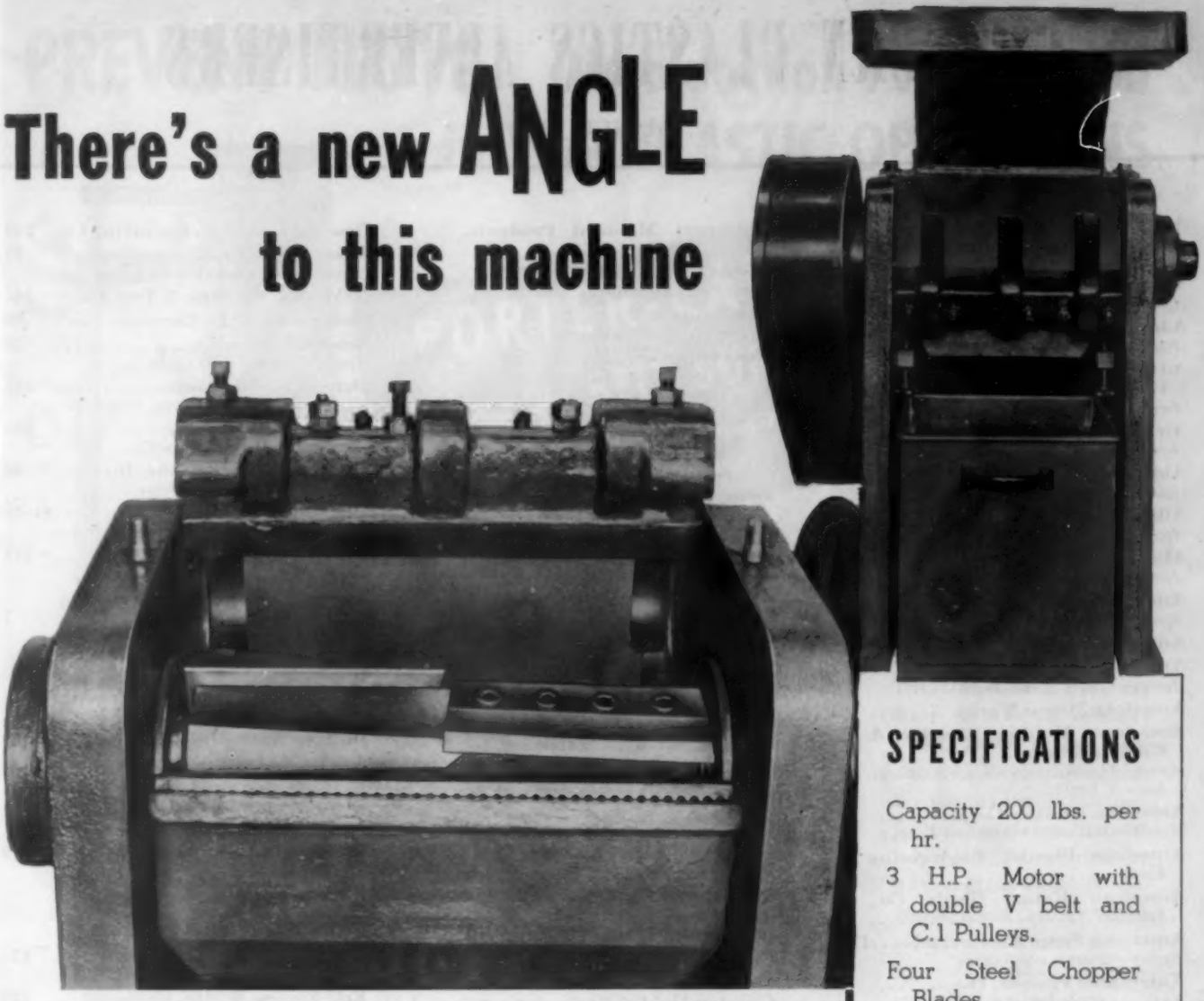
Chemist or Chemical Engineer experienced in the production and formulating of phenolic molding compounds. Position of responsibility located Middle West. State qualifications. Address Box C287, Modern Plastics.

FOR SALE: Hyd. Presses, 1 self contained fully aut. 5 ton Denn., 1—36" x 36", 14" ram, 200 ton, 1—26" x 32", 14" ram, 385 tons; 5—12" x 12", 7½" rams, 50 ton; 2—15" x 15", 8" ram, 75 tons; 1—15" x 15", 10" ram, 100 tons; 3—19" x 24", 10" ram, 78 tons; 3—13" x 19", 12" ram, 100 ton; 1—20" x 20", 13" ram, 200 tons with pullbacks; 3—23" x 17½", 8" ram, 75 tons with pullbacks; 1—16" x 17", 8" ram, 75 tons, 1—22" x 15", 8" rams, 75 ton; 7—12" x 13", 6½" ram, 50 ton; 4—8" x 9½", 4½" ram, 20 ton; 3—1000 ton 29" ram presses; 3—2043 ton press, 34" ram; 1—24" x 30", 550 ton, 15" ram; 1—20" x 20", 10" ram, 100 ton; Pumps: 1—HPM triplex 1½ GPM 2500#, 1—Rob. Dup. 1½ GPM, 4000#, 1—Gould Trip. 12 GPM 1250#, 1—Worth 2½ GPM 4000#, 1—Worth. Trip. 12 GPM 2500#, 1—Elmes Dup. 1½ GPM 2850#; Preform Presses, Stokes Model T single punch. 1—DDS—2 Stokes, 1—Kux ICS Extr.; 1—Royle Perfected #3 cont. motor bedplate, 1—Housatonic 6" worm, Mills, Calenders, Mixer Laboratory Presses, Accumulators, Hydropneumatic and weighted types, etc. HIGHEST PRICES PAID FOR YOUR USED EQUIPMENT. Universal Hydraulic Machinery Company, 285 Hudson Street, New York City 13.

CHEMICAL ENGINEER, B.S., 26, married, 4 years experience in the development, compounding, coloring, and extrusion of vinylidene chloride resins for filaments. Some vinyl experience. Desires position in product development, technical service or sales. Reply Box C285, Modern Plastics.



There's a new ANGLE to this machine



These pictures show fore and aft views of the De Mattia Granulator.

This granulator, one of the simplest, yet most rugged and efficient scrap grinders ever offered to the plastics industry, now contains a unique new feature. Four large steel chopper blades are set at angles to each other—on the bias—to give greater cutting capacity and more granulating action.

Another special feature, exclusive with De Mattia, reduces contamination of materials to a minimum: Working parts that come in contact with the molding materials can be hand wiped completely, and the machine put into operation again in less than 3 minutes actual elapsed time.

It's easy to understand why the name De Mattia means fine quality equipment throughout the plastics industry.

SPECIFICATIONS

Capacity 200 lbs. per hr.

3 H.P. Motor with double V belt and C.1 Pulleys.

Four Steel Chopper Blades.

High Grade Roller Bearings with Positive Seal.

Standard Screen with 1/4" openings.*

Floor Space Required 32" × 44"

Net Weight with Motor (approx.) 800 lbs.

*Other Sizes Furnished to Order.

DE MATTIA *Machine and Tool Co.*

CLIFTON, NEW JERSEY

New York Office — 50 Church Street
Cable Address: BROMACH, N. Y.

MODERN PLASTICS ADVERTISERS

MARCH 1947

Ace Abrasive Laboratories..... 216
Agency—Newmark's Advertising Agency, Inc.

Accurate Molding Corp...... 220
Agency—Rothschild Advertising Agency

Adamson United Co......78–79
Agency—Smith, Taylor & Jenkins, Inc.

Advance Solvents & Chemical Corp...... 217
Agency—S. Duane Lyon, Inc.

Airtronics Mfg. Co...... 181
Agency—Larry Pendleton & Associates

Aldrich Pump Co., The..... 29
Agency—Harris D. McKinney

Allied Products Corp......50, 215
Agency—Charles M. Gray & Associates

Aluminum Co. of America..... 45
Agency—Fuller & Smith & Ross Inc.

American Cyanamid Co....146–147, 249
Agency—Hazard Advertising Co.

American Injection Molders, Inc. 213

American Insulator Corp...... 88
Agency—Wm. B. Kamp, Inc.

American Mirror Works..... 219

American Molding Powder & Chemical Corp...... 211
Agency—H. W. Fairfax Advertising Agency, Inc.

American Plastics Corp...... 231
Agency—Gallard Advertising Agency

American Plastics Engineering Corp...... 235

American Rotary Tools Co., Inc...... 222

American Screw Co......17, 73
Agency—Sutherland-Abbott

Anigraphic Process, Inc...... 223

Atkins, E. C., & Co...... 233
Agency—Evans Associates Co.

Atlantic Plastics, Inc...... 191
Agency—Harold Marshall Advertising Agency

Atlas Valve Co...... 241
Agency—W. F. Schaphorst Agency

Audit Bureau of Circulations... 202

Bakelite Corp....201, Inside Back Cover
Agency—J. M. Mathes, Inc.

Baker Castor Oil Co., The..... 19

Baldwin Locomotive Works, The 187
Agency—Ketchum, McLeod & Grove, Inc.

Ball & Jewell..... 211

Bamberger, A., Corp...... 214
Agency—H. W. Fairfax Advertising Agency, Inc.

Behr-Manning..... 36
Agency—Hevenor Advertising Agency, Inc.

Bell Telephone Laboratories..... 18
Agency—N. W. Ayer & Son, Inc.

Bethlehem Steel Co...... 195
Agency—Jones & Brakeley, Inc.

Birdsboro Steel Foundry & Machine Co...... 76
Agency—Beaumont, Heller & Sperling, Inc.

Boonton Molding Co...... 12
Agency—The Franklin Fader Co.

Bridgeport Moulded Products, Inc...... 64

Brilhart, Arnold, Ltd...... 71
Agency—Henri LaMothe Agency

Brown Co...... 218
Agency—Alley & Richards Co.

Buttondex Corp...... 206
Agency—Lancaster Advertising

Cambridge Instrument Co., Inc. 218
Agency—E. M. Freystadt Associates, Inc.

Carbide & Carbon Chemicals Corp...... 201
Agency—J. M. Mathes, Inc.

Carborundum Co., The..... 171
Agency—Comstock, Duffes & Co.

Carter Products Corp...... 224
Agency—Charles Oswald

Carver, Fred S., Inc...... 223
Agency—J. C. Bull, Inc.

Castolite Co., The..... 206
Agency—Learn-Wyly Advertising, Inc.

Catalin Corp. of America..... 1
Agency—Walter J. Gallagher Advertising

Cee-Bee Mfg. Co., The..... 227

Celanese Plastics Corp...... 9
Agency—Ellington & Co., Inc.

Celluplastic Corp...... 84
Agency—Lawrence Fertig & Co., Inc.

Central Screw Co...... 73

Chemaco Corp...... 85
Agency—R. T. O'Connell Co.

Chicago Molded Products Corp... 4
Agency—Almon Brooks Wilder, Inc.

Claremont Waste Mfg. Co...... 150
Agency—Walter J. Gallagher Advertising

Cleveland Container Co., The.... 215
Agency—The Nesbitt Service Co.

Classified.....242, 244

Connecticut Plastic Products Co. 210
Agency—Phillips Webb Upham & Co.

Consolidated Molded Products Corp...... 69
Agency—Walter J. Gallagher Advertising

Continental Can Co., Inc., Paper Div...... 30
Agency—Batten, Barton, Durstine & Osborne, Inc.

Continental Plastics Corp...... 230
Agency—Jim Duffy Co.

Continental Screw Co...... 73

Cook, Lawrence H., Inc...... 216
Agency—George T. Metcalf Co.

Corbin Screw Co...... 73

Cowles Co. Inc., The..... 204
Agency—Barlow Advertising Agency, Inc.

Creative Printmakers, Inc...... 221

Cruver Mfg. Co...... 243
Agency—Evans Associates Co.

Cumberland Engineering Co..... 236
Agency—Richard Thorndike

Cunningham, M. E., Co...... 208
Agency—Walker & Downing

Daniels-Kummer Engraving Co. 240

Dazor Mfg. Corp...... 32
Agency—Watts Advertising Agency

DeMattia Machine & Tool Co.... 245

Desimone, A. J., Corp...... 80

Despatch Oven Co...... 22
Agency—Harold C. Walker

Detroit Macoid Corp...... 183
Agency—Holden, Clifford, Flint, Inc.

Detroit Stamping Co...... 225
Agency—Charles Schweim Co.

Disston, Henry & Sons, Inc...... 40
Agency—Geare-Marston, Inc.

Dow Chemical Co., The.....24–25
Agency—MacManus, John & Adams, Inc.

Drakenfeld, B. F. & Co., Inc..... 212
Agency—Fuller & Smith & Ross, Inc.

du Pont de Nemours, E. I. & Co. Inc., Plastics Div...... 7
Agency—Batten, Barton, Durstine & Osborne, Inc.

Durez Plastics & Chemicals, Inc......**Inside Front Cover**
Agency—Comstock, Duffes & Co.

Durite Plastics Inc...... 199
Agency—Lawrence I. Everling

Eastman Kodak Co...... 179
Agency—J. Walter Thompson Co.

Elmes Engineering Works of American Steel Foundries..35, 177
Agency—Erwin, Wasey & Co., Ltd.

Enjay Co., Inc...... 157
Agency—McCann-Erickson, Inc.

Erie Engine & Mfg. Co...... 219
Agency—The Yount Co.

Erie Resistor Corp...... 57
Agency—W. S. Hill Co.

Exact Weight Scale Co., The.... 200
Agency—J. W. Sieverling

Fabricon Products, Inc...... 213

Farrel-Birmingham Co., Inc..... 54
Agency—Gassaway, Mark & Co.

Fellows Gear Shaper Co., Leominster Div...... 81
Agency—Hicks & Greist, Inc.

Felsenthal, G. & Sons..... 212
Agency—Lieber Advertising Co.

Fenwal, Inc...... 53
Agency—Cory Snow Inc.

Ferro Enamel Corp...... 224
Agency—Fuller & Smith & Ross, Inc.

Fortney Mfg. Co...... 237

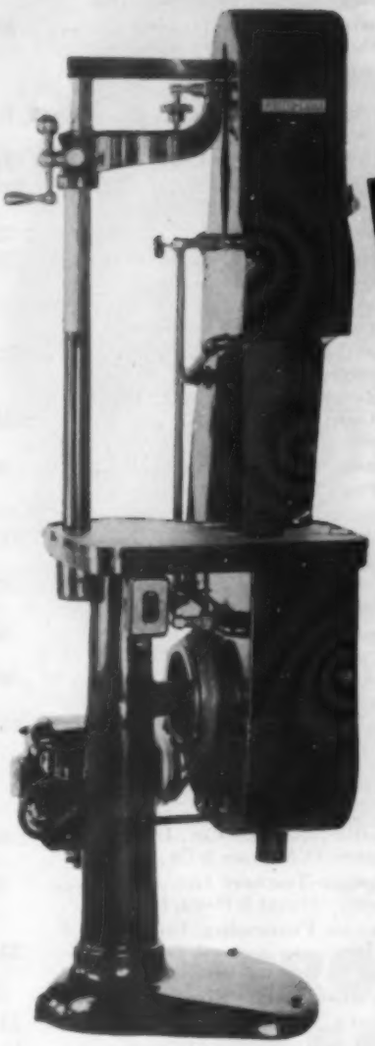
Franklin Plastics Div...... 221
Agency—The Yount Co.

Frenkel's Machines (Foreign) Ltd...... 239
Agency—W. H. Smith & Son, Ltd.

G. M. C. Process Corp...... 229

General Electric Co......**Back Cover**
Agency—Benton & Bowles, Inc.

PREVENT FLOW . . Discoloration . . Distortion in Your PLASTIC OPERATIONS



PORTER-CABLE *Abrasive* BELT SURFACER

Speeds Clean-Up . . Increases Production
Improves Finish



For thermoplastics and some thermo-setting plastics, the Porter-Cable Surfacing Methods prevent main worries: flow, discoloration and distortion.

In Wet-Belt Surfacing, the coolant is sprayed on before and after cutting, and thus keeps the belt free and clean at all times. Furthermore, the grindings do not weld and load the belt because this method eliminates heat.

The Flexible Belt follows the contour of a piece. For long-run repeat operations, a padded platen fits the flexible belt to the exact contour of the job. Even spherical pieces can be smoothly finished.

MODEL CN-2 Uses dry belt. Grinds on contact wheel, platen or free belt. Arbor for V-type driving pulley permits use of this unit independent of a bench grinder Adjustable for vertical or horizontal use within 90° arc. Has Resilient Contact Wheel —Platen—Abrasive Belt—Idler—Motor Mounting (electric motor not included).

MODEL B-6W Cuts Cost and Improves Finish. Especially designed for curved or irregular work, this model will handle most jobs free-hand or with simple fixtures. You can make a single pass in a fraction of usual surfacing time.



MODEL WG-4 Does Most Operations Free-Hand! Porter-Cable's new all-around Wet-Belt Surfacer . . . . Ideal for light operations. Grinds flat on the platen—line contact grinding on the resilient contact roll. Has self-contained coolant system and re-circulating tank. Drawer traps all grindings and waste.



MODEL N-2 A belt grinder conversion attachment for bench grinders that increases output 200% over ordinary Abrasive Wheel. Quickly adjusted to either vertical or horizontal position.

Write today for FREE copy of "Production Man Speaks." It describes a process as new — as vital — as the plastics industry itself.

Send also for film: "Machine of the Age." Loaned FREE for factory staff meetings.

Every Model Saves You Money!

PORTER-CABLE
MACHINE COMPANY
1606-3 N. SALINA ST. SYRACUSE, N. Y.

General Industries Co., The 185
Agency—Fuller & Smith & Ross, Inc.

Gering Products, Inc. 197
Agency—Diedrich Advertising Service

Girdler Corp., The 167
Agency—Roche, Williams & Cleary, Inc.

Goodrich, B. F., Chemical Co., Geon Div. 3
Agency—The Griswold-Eshleman Co.

Goodrich, B. F., Co. 212
Agency—Batten, Barton, Durstine & Osborne, Inc.

Great American Color Co. 225
Agency—Bodine & Meissner

Greer Hydraulics Inc. 232
Agency—Joseph S. Vogel & Co.

Hannifin Mfg. Co. 226
Agency—Edwin H. Verrall

Hardy Plastics & Chemical Corp. 203
Agency—Walter J. Gallagher Advertising

Harper, H. M. Co., The 73

Hein-Werner Motor Parts Corp. 238
Agency—Arthur R. Moore, Inc.

Hercules Powder Co. 55
Agency—Fuller & Smith & Ross Inc.

House of Plastics., Inc. 241

Hummel-Ross Fibre Corp. 14
Agency—Courtland D. Ferguson, Inc.

Hydraulic Machinery Inc. 49
Agency—Florez, Phillips & Clark, Inc.

Hydraulic Press Mfg. Co., The ... 13
Agency—Fuller & Smith & Ross Inc.

Ideal Plastics Corp. 240
Agency—Atlantic Advertising Co.

Impression Products Div. of Stamp Rite Inc. 16
Agency—Jasper, Lynch & Fishel

Injection Molding Co. 228

Interlake Chemical Corp. 161
Agency—The Bayless-Kerr Co.

International Molded Plastics, Inc. 10
Agency—The White Advertising Co.

International Screw Co. 73

Kabar Mfg. Corp. 206
Agency—Lee Murray Co.

Kearney & Trecker Corp. 11
Agency—Klau-Van Pietersom-Dunlap Associates

Kenneweg Sales & Engineering Co. 229

Keyes Fibre Co. 34
Agency—Alley & Richards Co.

Kingsley Stamping Machine Co. 237
Agency—Conners Co.

Kline Mfg. Co., The 175
Agency—Byer & Bowman Advertising Agency

Krasilovsky Bros. Trucking Corp. 240

Kuhn & Jacob Molding & Tool Co. 207
Agency—Eldridge-Northrop, Inc.

Kurz-Kasch, Inc. 52
Agency—Kircher, Helton & Collett

Lamson & Sessions Co. 73

Lane, J. H. & Co., Inc. 198

Lester Phoenix, Inc. 6
Agency—Gregory-House, Inc.

Lucidol Div., Novadel-Agene Corp. 214
Agency—Landsheft, Inc.

M & N Machine Tools Works 235

Maas & Waldstein Co. 159
Agency—Doyle, Kitchen & McCormick, Inc.

Manufacturers Chemical Corp. 85
Agency—R. T. O'Connell Co.

Marblette Corp., The 65
Agency—Perlowin Studios

Martindell Molding Co. 235
Agency—Eldridge-Northrop, Inc.

Materials & Methods 77

Mearl Corp., The 233

Mears-Kane-Ofeldt, Inc. 227
Agency—R. E. Lovekin Corp.

Meyer & Brown Corp. 224
Agency—Friewald & Coleman

Michigan Molded Plastics, Inc. ... 23
Agency—Wallace-Lindman, Inc.

Midwest Molding & Mfg. Co. 229
Agency—Robert A. Gallagher Service

Milford Rivet & Machine Co. 73

Mills, Elmer E., Corp. 37
Agency—Bozell & Jacobs Inc.

Minnesota Plastics Corp. 209
Agency—Wilson Advertising Agency

Mirro-Plex, Inc. 223
Agency—Daniel E. Brown

Miskella Infra-Red Co., The 234
Agency—Foley Advertising Agency

Monsanto Chemical Co. 39, 63
Agency—Gardner Advertising Co.

Mosinee Paper Mills Co. 59
Agency—Klau-Van Pietersom-Dunlap Associates

Muehlstein, H. & Co., Inc. 46
Agency—Goold & Tierney Inc.

N. R. K. Mfg. & Engineering Co. 210
Agency—Kreicker & Meloan, Inc.

National Adhesives 43
Agency—G. M. Basford Co.

National Lock Co. 73

National Plastic Products Co., The 72
Agency—The Joseph A. Wilner Co.

National Rubber Machinery Co. 27
Agency—The Griswold-Eshleman Co.

National Screw & Mfg. Co. 73

National Transparent Plastics Co. 208
Agency—du Pont & Cahalin, Inc.

Newark Die Co., Inc. 219
Agency—Atlantic Advertising Co.

New England Screw Co. 73

New Hermes, Inc. 215
Agency—Edward Hamburger Advertising Co.

New Jersey Sprayed Products Co., Inc. 216
Agency—The House of J. Hayden Twiss

New Jersey Zinc Co., The 68

Niacet Chemicals Div. of U. S. Vanadium Corp. 196

Nixon Nitration Works 75
Agency—Alfred A. Morse & Co.

Northern Industrial Chemical Co. 250
Agency—The Callaway Associates

Norton Laboratories, Inc. 83
Agency—Comstock, Duffes & Co.

Parker-Kalon Corp. 62, 73
Agency—Horton-Noyes Co.

Pawtucket Screw Co. 73

Pedlow Machine Co. 234
Agency—John Gilbert Craig

Pheoll Mfg. Co. 73

Phillips Screw Manufacturers ... 73
Agency—Horton-Noyes Co.

Plaskon Div. 136–137
Agency—Meldrum & Fewsmith

Plasti-chrome, Inc. 232
Agency—Force, Inc.

Plastic & Die Cast Products Corp. 226
Agency—Ted H. Factor Agency

Plastic Manufacturers, Inc. 58
Agency—J. C. Bull Inc.

Plastics Catalogue Corp. 66–67

Plastics Guild Corp. 211

Plastics Industries Technical Institute 82
Agency—Beaumont & Hohman Inc.

Plastiplate Co., Inc. 26
Agency—Ira S. Kahn Agency

Plax Corp. 87
Agency—The Charles Brunelle Co.

Porter-Cable Machine Co. 247
Agency—Barlow Advertising Agency, Inc.

Radio Receptor Co., Inc. 51
Agency—O. S. Tyson & Co., Inc.

Ranger-Tennere Inc. 48
Agency—Moore & Hamm, Inc.

Rayon Processing Co. of R. I., Inc. 237
Agency—Richard Thorndike

Reading Screw Co. 73

Recto Molded Products, Inc. 214
Agency—Creative Advertising

Reed-Prentice Corp. 8
Agency—Howard Wesson Co.

Reichhold Chemicals, Inc. 163
Agency—MacManus, John & Adams, Inc.

Respro, Inc. 33
Agency—Horton-Noyes Co.

Rhode Island Laboratories, Inc. 56
Agency—Theodore J. Funt Co.

Richardson Co., The 21
Agency—The Buchen Co.

Riegel Paper Corp. 44
Agency—W. L. Towne Advertising

Robinson Industries, Inc. 221
Agency—The Yount Co.

Rohden Mfg. Co. 227
Agency—R. W. Sayre Co.

A BRESKIN PUBLICATION

MODERN PLASTICS

Published by MODERN PLASTICS, INC.
122 East 42nd Street New York 17, N. Y.



THIS

AERO BRAND STEARATES

STORY SPEAKS FOR ITSELF!

AERO* BRAND STEARATES . . . Calcium . . . Zinc . . . Aluminum . . . Magnesium . . . are products of the finest manufacturing facilities of their kind. The famous AERO BRAND seal on your stearate supplies means a fine, fluffy texture, uniformity and other recognized superior processing characteristics contributing basic advantages to the efficiency and economy of your operations. For product quality... for service... for the all-around dependability on which economical operations rely...it's CYANAMID AERO BRAND STEARATES.

CYANAMID'S MODERN FACILITIES BECOME YOUR DEPENDABLE SOURCE OF SUPPLY WHEN YOU SPECIFY...

AERO BRAND STEARATES



Industrial Chemicals Division

AMERICAN CYANAMID COMPANY

30 ROCKEFELLER PLAZA · NEW YORK 20, N. Y.

*Trade Mark

Rohm & Haas Co. 173
Agency—Newell-Emmett Co.

Royle, John & Sons 220

Russel Burdsall & Ward Bolt & Nut Co. 73

St. Regis Sales Co. 28
Agency—G. M. Basford Co.

Sarco Co., Inc. 213
Agency—W. L. Towne Advertising

Schulman, A., Inc. 244
Agency—The Jessop Advertising Co.

Schwartz Chemical Co. 239
Agency—Walter W. Wiley

Scovill Mfg. Co. 73

Shakeproof, Inc. 73

Shaw Insulator Co. 86
Agency—The Charles Brunelle Co.

Sillcocks-Miller Co., The 241
Agency—Fred H. Ebersold, Inc.

Simonds Saw & Steel Co. 207
Agency—Sutherland-Abbott

Society of the Plastics Industry (National Plastics Exp.) 42
Agency—James R. Flanagan Advertising Agency

Southington Hardware Mfg. Co., Inc. 73

Special Formula Chemical Co. ... 194

Stamp Rite Inc., Impression Products Div. 16
Agency—Jasper, Lynch & Fishel

Standard Tool Co. 208
Agency—The Davis Press, Inc.

Stekert, Martin M. 238
Agency—Walter W. Wiley

Steel Co. of Canada Ltd., The ... 73

Stensgaard, W. L. & Assoc. Inc. 210
Agency—Ruthrauff & Ryan Inc.

Sterling Bolt Co. 73

Stokes, F. J. Machine Co. 165
Agency—McLain Organization, Inc.

Stricker-Brunhuber Co. 233
Agency—Harold P. Preston

Stronghold Screw Products Inc. 73

Superdraulic Corp. 61
Agency—Florez, Phillips & Clark, Inc.

Swedlow Plastics Co. 41

Synthetic Resins, Ltd. 228

Tech-Art Plastics Co. 169
Agency—J. B. Rundle Advertising

Teckna Co., Inc. 251
Agency—Lee-Stockman, Inc.

Tennessee Eastman Corp. 149
Agency—Kenyon & Eckhardt Inc.

Tepper Fields Corp. 193
Agency—The H. L. Mihic Co.

Thropp, Wm. R. & Sons Co. 218
Agency—Rickard Advertising Agency, Inc.

Timken Roller Bearing Co., The 205

Tinnerman Products, Inc. 189
Agency—The White Advertising Co.

Trenco Inc. 232

Union Bay State Chemical Co. Inc. 222
Agency—Bennett, Walther & Menadier, Inc.

Union Carbide & Carbon Co. ..... 201, Inside Back Cover
Agency—J. M. Mathes, Inc.

Union Pacific Railroad 60
Agency—The Caples Co.

United States Plywood Corp. 230
Agency—Marschalk & Pratt Co.

Universal Plastics Corp. 236
Agency—Cayton Inc.

Valite Corp. 231
Agency—Brandt Advertising Co.

Van Dorn Iron Works Co., The .. 31
Agency—The Hubbell Advertising Agency, Inc.

Varcum Chemical Corp. 20

Velepec, Fred M., Co. 221

Velveray Corp. 228
Agency—Harry Serwer, Inc.

Victory Mfg. Co. 217
Agency—Earle Ludgin & Co.

Vulcanized Rubber & Plastics Co. 70
Agency—The Schuyler-Hopper Co.

War Assets Administration 74
Agency—Fuller & Smith & Ross Inc.

Watlow Electric Mfg. Co. 198
Agency—Eggers-Rankin Advertising Service

Watson-Stillman Co. 15
Agency—O. S. Tyson & Co., Inc.

Weinman Bros., Inc. 225
Agency—T. R. Bauerle Advertising Agency

Westinghouse Electric Corp. 130
Agency—Fuller & Smith & Ross Inc.

Wheelco Instruments Co. 38
Agency—Don Proctor Advertising

White, S. S., Dental Mfg. Co., The 236
Agency—Peterson & Kempner, Inc.

Wiegand, Edwin L., Co. 47
Agency—Smith, Taylor & Jenkins, Inc.

Wilson Gold Stamping Machine Co. 234
Agency—Andrews-Johnson

Wolverine Bolt Co. 73

Worcester Moulded Plastics Co. ... 252
Agency—C. Jerry Spaulding Inc.



THIS LINE IS *Busy*—IT'S PLASTIC

Most lines are busy when plastics are used. For plastics improve just about everything they touch. An instance is the telephone. Remember the old-fashioned, cumbersome instrument? Then compare it with the smart, new handset shown in the cutaway drawing above. Connecticut Electric, a division of Great American Industries, Inc., makes the handset to close tolerances and chose *Northern* to precision-mould the case.

Northern, with over thirty-eight years experience moulding plastics, is familiar with all moulding compounds, knows when to use each one properly and how to mould it best.

If you use plastic parts — or might use them to advantage — why not pick up *your* handset now and call *Northern!*

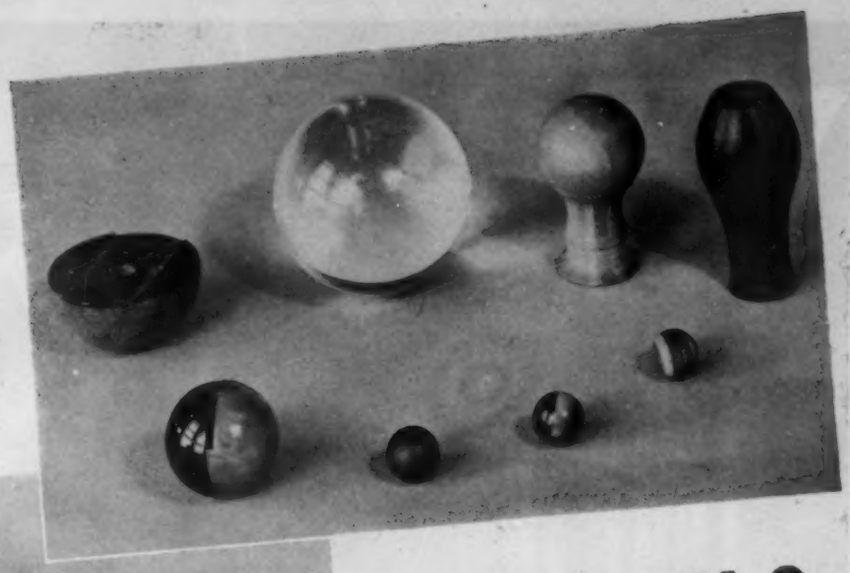
Northern

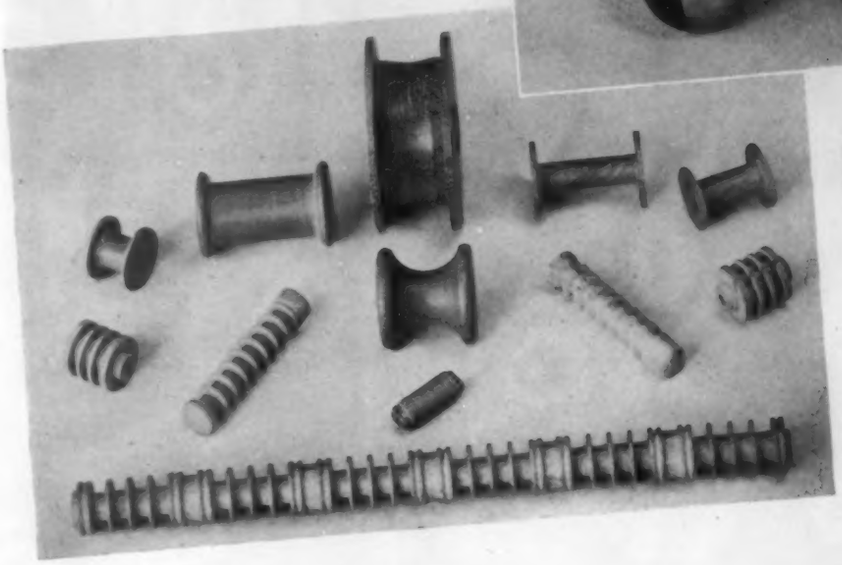
INDUSTRIAL CHEMICAL CO.

38 Years of Plastic Moulding Experience

7-11 ELKINS ST., SO. BOSTON, MASS.

PRECISION FORMING





AN exclusive, improved process designed and engineered by TECKNA makes possible close tolerance forming in production quantities.

Any intricate cylindrical shapes formed from thermoplastic and thermosetting materials are within the scope of this newly developed plastic forming machinery. Results offered by TECKNA have never before been accomplished.

Convincing performance records and samples are available to prove the close tolerance and precise forming available thru TECKNA.

TECKNA operates its own tool room, makes its own molds and dies. Call on TECKNA for cylindrical shapes, balls, rods, pulleys, industrial and product parts.

Send for Bulletin M P outlining the completeness of TECKNA service.

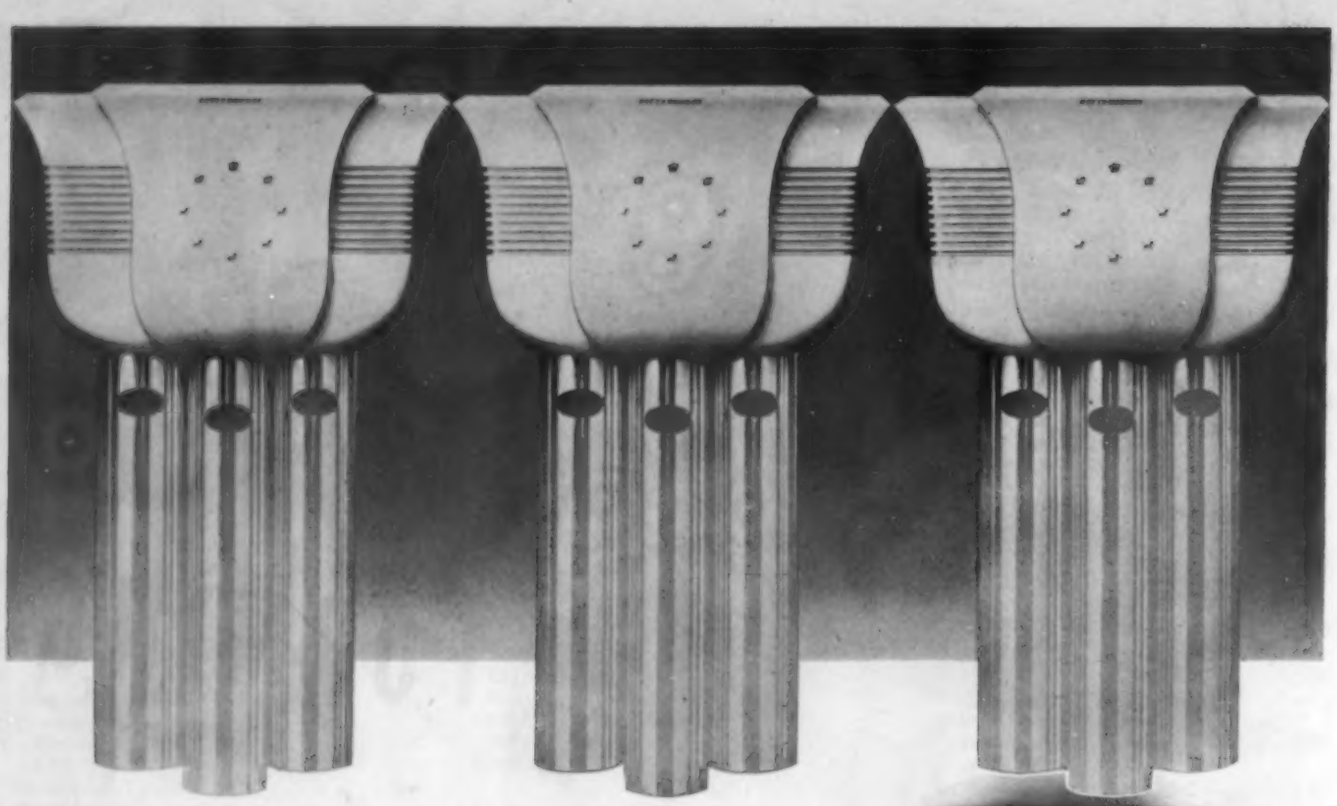
TECKNA COMPANY INC.

Plastic Fabricators

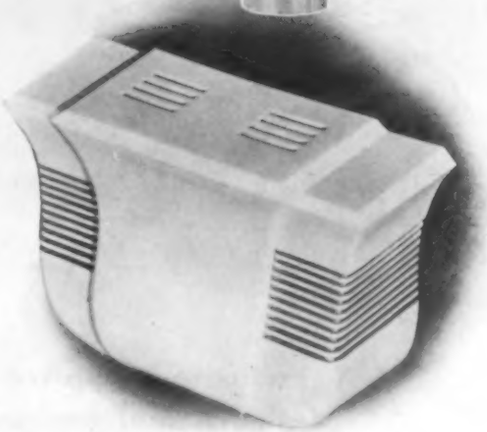
NORTHERN B'LVD & 223rd ST., BAYSIDE - NEW YORK

TELEPHONE BAYSIDE 9-5302

TECKNA



Chimes courtesy of The Rittenhouse Co., Inc., Honeoye Falls, N. Y.



A Story in Harmony

In chime manufacture, tonal quality and beauty are prime requisites. The Rittenhouse Co., Inc. of Honeoye Falls, N. Y. was intent on improving both. The application of Worcester Moulded plastics, as it has for so many concerns, turned the trick. With meticulous engineering care, we were able to reproduce faithfully by injection moulding every line and sweep of the design, and the rich tonal quality sought by Rittenhouse. Both we and the House of Rittenhouse are happy. As custom injection moulders exclusively, you, too, can count on our cooperation and vast facilities for development and economical production.



Custom Injection Moulding

WORCESTER MOULDED PLASTICS CO.

14 HYGEIA STREET, WORCESTER 8, MASS.

17 East 42nd St., New York 17, N. Y.

130 West Chippewa St., Buffalo 2, N. Y.



Her face is your good fortune

Oh, you beautiful doll! . . . beautiful in ways that do not meet the casual eye. She is especially beautiful to product engineers and industrial designers—when they realize that her face was formed, *and formed with ease,* from VINYLITE Brand Plastic calendered rigid sheeting!

This versatile plastic holds many surprises for people whose job it is to plan, invent, design and produce new things. Most of you are aware of its amazing dimensional stability—the quality that sets it apart—makes it invaluable for such uses as measuring-instruments, airplane enclosures and the like. But realize, too, that it can be formed in virtually any shape, and by standard methods. Do not limit your thinking to "the flat," when you experiment with VINYLITE rigid sheet!

Shipmen and engineers find it a pleasure to work with. Its surface is hard. It will not burn. It is available in all the colors of the rainbow—or clear like glass. Write Department BO-7 for technical data and working samples.

VINYLITE

TRADE—MARK

PLASTICS

BAKELITE CORPORATION, *Unit of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.

• ENGINEERED AND MOLDED AT NO. 1 PLASTICS AVENUE



The right time for plastics

• Meet the Heralder—a new General Electric alarm clock that really rings the bell! Its handsome ivory case, molded in plastics by General Electric, is economical to produce. And the lustrous surface of this lightweight but durable plastic contributes the beauty and eye appeal that help to make the product a real best seller.

Whether you make clocks, cosmetics, or heavy machinery, General Electric's *complete* plastics service is equipped to design, engineer and mold plastics parts to meet your own individual requirements. So when you think of plastics, think first of General Electric, the world's largest manufacturer of finished plastics products.

May we send you, without obligation, the interesting illustrated booklet called, "What Are Plastics?" Just write Plastics Division, Chemical Department, General Electric Company, 1 Plastics Avenue, Pittsfield, Massachusetts.

G-E Complete Service—Everything in Plastics

BACKED BY 53 YEARS OF EXPERIENCE. We've been designing and manufacturing plastics products ever since 1894. G-E research works continually to develop new materials, new processes, new applications.

NO. 1 PLASTICS AVENUE—complete plastics service—engineering, design and mold-making. Our own industrial designers and engineers, working together, create plastics parts that are both scientifically sound and good-looking. Our own toolrooms are manned by skilled craftsmen—average precision mold experience, 12 years.

ALL TYPES OF PLASTICS. Facilities for compression, injection, transfer and cold molding . . . for both high and low pressure laminating . . . for fabricating. And G-E Quality Control—a byword in industry—means as many as 160 inspections and analyses for a single plastic part.

GENERAL ELECTRIC

CD 47-451

GENERAL ELECTRIC PLASTICS FACTORIES ARE LOCATED AT SCRANTON, PA., MERIDEN, CONN., COSHOCTON, OHIO . . . FORT WAYNE, IND. . . . TAUNTON AND PITTSFIELD, MASS.

EVERYTHING IN Plastics